LIBRARY OF CONGRESS
MAR 13 1900
COPYRIGHT DEPOSIT

THE AMERICAN GAS LIGHT JOURNAL

ACOMAN & KENNY, N.Y.

PUBLISHING OFFICE No. 32 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME LXXII. No. 11. Whole No. 1,292. | NEW YORK, MONDAY, MARCH 12, 1900. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager. THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 32 Pine Street, New York.

Collections are invariably made directly from this office for subscriptions, advertisements, etc. We have agents to solicit the same, but they are not authorized to receipt for money.

Terms of Subscription, Including Postage.—For the United States and Canada, $3 per annum. European countries, $5 (£1—25 francs). All payments to be made in advance. Single copies, 10 cents.

Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

Remittances should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A. M. Callender & Co.

The **American News Company,** Nos. 39 and 41 Chambers street, New York, are agents for this JOURNAL. Newsdealers will send orders to them.

Books.—We will forward by express, at publisher's lowest rates, any book—scientific or otherwise—to any address in the United States or Canada. We would suggest to our patrons that to avoid the risk and expense consequent on sending us the money (we do not send books C. O. D.), that orders for books be sent us through the Purchasing Department of the American Express Company.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

CONTENTS.

An Asterisk (*) denotes an illustrated article.

OFFICIAL NOTICES—

Sixteenth Annual Meeting, Ohio Gas Light Association 401

Wrinkle Department, Western Gas Association 401

EDITORIALS—

Briefly Told 402

Death of the Hon. John M. Hill—The Sixteenth Annual Meeting of the Ohio Gas Light Association—Notes.

Proceedings, Thirtieth Annual Meeting of the New England Association of Gas Engineers—Official Report—Revised by the Secretary—Continued from Page 370. 402

First Day, Morning Session—Then, Now and Later, by Mr. John A. Waters, Stamford, Conn.—Discussion—Opening of the Question Box—"What Successful Substitute for Cast Iron Gas Mains Has the High Price of Iron Developed?"—First Day, Afternoon Session—Report of Committee on Nominations—Election of Officers—* "Oven and Retort House Construction and Results"—Four Years' Experience with Prepayment Meters, by Mr. N. O. Goulding, Natick, Mass.—Discussion—Another Question, "Method of Handling Money and Accounts of Prepayment Meters."

Seventh Annual Meeting, Michigan Gas Association—Synopsis of Proceedings 411

First Day, Feb. 21, Morning Session—Roll Call—Report of the Executive Committee—Election of New Members—Report of Secretary and Treasurer—A Fraternal Telegram—Inaugural Address—Differential versus Uniform Prices for Gas, by Mr Sedgwick Dean.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES 414

Mr. Geo. L. Dunbar Takes Charge at Princeton, Ills.—Death of Mr. W. H. Addicks—Cheaper Gas for Newton, Mass.—Mr. W. B. Miller Takes Charge at Riverton, N. J.—The Haverhill Case—A Budget from "Observer"—Extension of the Monmouth (Ills.) Company's Franchise—The Oakland (Cal.) Company Rewards the Firemen—A Gas Price Bill—Sale of the Titusville (Pa.) Company—Something from St. Cloud, Minn.—Something from Dayton, O.—The Terre Haute (Ind.) Pipe Line Service Company—Annual Meeting, Providence, R. I.—Pumping Artificial Gas at High Pressure—And Other Items.

The Market for Gas Securities 415

[OFFICIAL NOTICE.]

Sixteenth Annual Meeting, Ohio Gas Light Association.

OFFICE OF THE SECRETARY,
DELAWARE, OHIO, Feb. 15, 1900.

The sixteenth annual meeting of the Ohio Gas Light Association will be held at Columbus, Ohio, March 21st and 22d, 1900.

The President, Mr. A. P. Lathrop, of St. Paul, Minn., will call the meeting to order, on Wednesday, March 21st, at 9:30 A.M., in convention hall at the Chittenden Hotel, the headquarters. An address of welcome will be delivered by the Hon. George K. Nash, Governor of Ohio. A response will be made by ex-Governor Asa S. Bushnell, President Springfield Gas Company.

The following papers will be presented:

"By-Product Coke Ovens as a Source of Gas Supply," by Mr. Peter Young, Gas Engineer, Detroit, Mich.

"Street Lighting," by General Andrew Hickenlooper, President Cincinnati (Ohio) Gas Light and Coke Company.

"Prepayment Meters," by Mr. John D. McIlhenny, President Citizens Gas Company, Terre Haute, Ind.

"The Present Status of Fuel Gas," by Mr. John R. Lynn, Supt. Portsmouth (Ohio) Gas Company.

"Gas Appliance Exchanges," by Mr. Fred. R. Persons, with Maryland Meter and Mfg. Co., Toledo, Ohio.

"Some New Ideas about Oxide Purification," by Mr. B. E. Chollar, Engineer Laclede Gas Company, St. Louis, Mo.

The Question Box, which is always an interesting feature, will be given special consideration. Each member is requested to make contributions for it, and send them to the Secretary not later than March 7th, so that they may be printed.

The gas works, the electric light plant, with a new 685-horse power gas engine, the pipe works and other places of interest will be open to the inspection of the members.

The ladies will be cordially welcomed and cared for.

An opportunity will be given any of the speakers at the meeting to correct their remarks before leaving Columbus, but not after, as all the reports will be turned over to the printers immediately after the adjournment of the meeting.

The Chittenden is conducted on the American plan, and the following rates have been secured for the meeting: $2.50, $3 and $3.50 per day for rooms without bath; $3.50 and $4 per day for rooms with bath. The Chittenden hopes to entertain all of the Association, and will put forth every effort to make the members comfortable. The most satisfactory quarters are always obtained by writing in advance to the hotel people.

The Secretary will furnish with pleasure application blanks for membership, and any further information which may be desired relative to the meeting.

T. C. JONES, Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WRINKLE DEPARTMENT WESTERN GAS ASSOCIATION,
OFFICE OF THE EDITOR,
112 NORTH BROAD ST., PHILA., PA., Feb. 16, 1900.

To the Members of the Western Gas Association: The Western Gas Association elected me last year Editor of its Wrinkle Department. The duty of the Editor is the securing (for presentation in convenient form to the Association, at its annual meeting), all possible wrinkles, ideas, devices, suggestions, etc., that during the year have been found by the members to be clever and helpful, in either the construction or operation of a gas works or company.

The success of the Wrinkle Department has been marked. It is looked forward to yearly with interest. *Its success, however, is de*

pendent on the co operation of the members. Will you not kindly help the success of this feature at this year's meeting by sending me shortly a brief description of any thing or idea that you may have recently noticed, or that occurs to you as suitable for a "wrinkle?" Whether this be something noted by either yourself or your assistants or helpers, in your own works or in those of another, is not material. It is the point itself that is desired, and that each member is asked to kindly contribute, whenever possible.

Drawings necessary to illustrate an idea need not be exact or carefully made, a simple rough sketch will be sufficient, and will be redrawn here if desirable. Your active co-operation in the above will be appreicated by the Association at large, and by the Wrinkle Editor in particular.

Very truly yours,
F. H. Shelton, Editor.

BRIEFLY TOLD.

Death of the Hon. John M. Hill.—We regret to have to report the death of the Hon. John M. Hill, who passed away, at his home in Concord, N. H., the morning of the 4th inst., after a prolonged illness. Deceased, who was born in Concord, November 5, 1821, resided in his birthplace all his life, the varying phases of which—as editor, politician, financier and churchman—were sufficient to cause him to be widely known. He served the Concord Gas Light Company as Treasurer and agent for a lengthy period, and was prominent in the early affairs of the New England Association of Gas Engineers, in which body he was elected to membership at, if we mistake not, its second annual meeting. He served on its Board of Directors during the years 1875-76-77-78 and 79, and although he did not actively participate in its meetings, since his retirement from business some 10 years ago, he retained his membership to the end. In due time we will give some account of his useful career.

The Sixteenth Annual Meeting of the Ohio Gas Light Association.—The official notice prepared by Secretary Jones, respecting the 16th annual meeting of the Ohio Gas Light Association, to be held this year in Columbus, the 21st and 22d insts., goes to show that the spirit which caused its formation still animates it. The paper list details a series of subjects certain to hold the attention of those who will take part in the meeting, and that will just as certainly be thoughtfully considered by the fraternity at large when the reports of the meeting are published. President Lathrop and Secretary Jones are to be congratulated over the thoroughness with which they have arranged the preliminaries, and it may be taken for granted that a good attendance at the sessions will be their reward. The Secretary's hint, that "The most satisfactory quarters are always obtained by writing in advance to the hotel people," is well worth remembering and acting upon.

Notes.—Mr. Henry Birkenbine has resigned from the superintendency of the York (Pa.) Gas Company.——At the annual meeting of the shareholders in the New Amsterdam (N. Y.) Gas Company no change was made in the Directorate. The Board is: James Jourdan, August Belmont, A. N. Brady, Chas. F. Dieterich, H. B. Hollins, J. C. Tomlinson, A. T. French, H. H. Rogers, Emanuel Lehman, John Sloane, Chas. F. Cutler, Harry Keene and F. S. Hastings.——The City Gas Company, of Norfolk, Va., has awarded to the Parker-Russell Mining and Manufacturing Company, of St. Louis, a contract for three benches of 6's and one extra arch. The benches will have the firing pit in the rear.——Mr. J. D. Shattuck, local Superintendent for the Philadelphia Suburban Gas Company's properties in Darby, Clifton, Lansdowne and Sharon Hill—all of Pennsylvania—is to be congratulated over the success of his methods in inducing people to use gas, even though many of the residents are decidedly of the suburban order. A friend of the Secretary of the Company (Mr. F. H. Shelton), however, is inclined to think that some danger is connected with Mr. Shattuck's expansion tactics, for the friend recently forwarded an "inclosure," in the lines of which we find the following: "Since the introduction of gas into their dwellings some of the residents have slept with several windows open in order to avoid dying unexpectedly!"——The gas works at Nelson, British Columbia, will be completed by April 1st.——Dr. J. D. Crawford has been appointed Manager of the Menominee (Mich.) Gas Light and Fuel Company, in addition to the Treasurership thereof. Mr. E. A. Hyde continues as Superintendent of the Company.——Colonel John E. Mehrer, prominent in the affairs of the Atlantic City (N. J.) Gas Company, died suddenly at Niagara Falls, N. Y., the morning of the 1st inst. He was in his 55th year.——At a recent meeting of the Directors of the Knox Gas and Electric Company, of Rockland, Me., it was ordered that on and after April 1st the net selling rates should be: On illuminating account, $2 per 1,000; on fuel account, $1.25 per 1,000. These are pretty low rates for the locality named, all things considered.——The Berlin Iron Bridge Company, of East Berlin, Conn., has received through a large exporting house in Philadelphia a contract for 11 plate girder bridges, to be sent abroad.——The gas and electric lighting interests of Columbus, Miss., have been finally consolidated, under the title of the Columbus Light and Power Company. The gas plant will be rebuilt, as it should be.

[Official Report.—Revised by the Secretary.—Continued from Page 370.]

PROCEEDINGS, THIRTIETH ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

Held at Young's Hotel, Boston, Mass., Feb. 21 and 22, 1900.

First Day, Feb. 21—Morning Session.

The President having made some announcements respecting routine matters, asked the Secretary to read the paper, by Mr. John A. Waters, of Stamford, Conn., as the author was unable to be present at the meeting. Secretary Gifford read the paper, the title of which was

THEN, NOW AND LATER.

Lest we forget the past and the lessons taught, the writer requests the members to go back with him over some of the more important experiences of years gone by, that our memories may be refreshed, and that in recurring the more vividly may appear the striking dissimilarity of theories and practices directly connected was gas manufacture "Then and Now;" and, noting the progress made and successes achieved, we may consistently and without overdrawing our imagination foresee changed conditions "Later."

In reverting to early practices in water gas manufacture, and comparing results then with results obtained now, we are reminded forcibly of the fact that the reduced cost of gas in holder (per material used) is not entirely due to improvements in apparatus. To improved operations in handling apparatus we must certainly attribute, in a measure, some of our success.

Then, a long blow, and in many cases where pressure blowers were in use, a "strong blow" was thought to be the one essential necessary to the obtaining of incandesence in the generator and the proper degree of heat in superheater; the time of blasting up extending from 20 to 45 minutes, the gas making period being correspondingly lengthy or more so, inasmuch as it ranged from 20 minutes to the even hour. The temperature of superheater was considered of the greatest importance, in that (and this was the theory as it was understood then) the olefiant gases commingling in the superheater with hydrogen should be subjected to a much higher temperature than that at which they were generated, in order that they might be made "homogeneous." You remember the word. We heard it often and used it familiarly, therefore, in practice the eye of the gas maker, that pyrometer of gas manufacture, was accustomed to a bright orange tint, and continued his blow until that color in heat appeared, when conditions were proper for a run. What mattered if in the early portion thereof a certain amount of carburetting material was decomposed and lamp black formed? What mattered the quality of product for 5, yes, 10 minutes? The make during this interval was rapid, astonishingly so, and although "thin" it was thought the carrier and supporter of the rich gases to follow later. And it was true; the gas delivered from the holder was uniform in candle power and, on the whole, satisfactory. So why bother with technicalities then? Water gas was being produced cheaper than coal gas, and had come to stay. Economy of production had hardly been considered, except in its relation to coal gas. Stoppages occuring in take-off pipes, seal and scrubbers very frequently were thought an almost unavoidable accompaniment to the speed of make. 'Tis true we sought to avoid this trouble in various ways, but with only partial success. It is also true that small take off connections and local conditions prevailing had much to do with choking of apparatus. If the coal fused repeatedly, and clinkers were an annoyance, we had bars and sledge-hammers to help relieve us. Checkerwork in superheater was still another cause for perplexity, it fouled often, and, if you remember, had to be removed and replaced through the stack opening at top. Yet withal water gas was in its infancy, and we were charitably inclined. As its use became more general, bringing with it the experience of others, a good natured rivalry in economy of production became manifest. That which engineers hitherto declined to have to do with became a subject for discussion in the meetings of the Associations; with new adherents came new ideas. Gradually we awoke to the understanding that condition not theory confronted us. We, who had thought high secondary heating of our carburetted gases positively necessary to the avoidance of loss of illuminant, stratification and condensation, bethought of temperature conditions with our coal retorts and oil benches, and, remembering, became convinced that we had gone to the extreme in the so-called fixing process. A lower temperature with increased surface was then thought the necessity, and invention gave it to us in the form of the double-superheater setting. Not directly because of the faults of the short superheater, but rather

that the use of the higher priced naphtha might be abandoned, and the lower priced crude oil substituted as an enricher, was this improvement presented. The use of the double superheater also gave to us the first actual improvement in apparatus. Low grade crude oil was used with satisfactory results, not, however, because of the extended gauntlet of heating surface through which the gases had to pass, but because of the good offices which the middle chamber performed in gasifying the liquid material used. It was no longer necessary to obtain incandescence on the surface of the coal in the generator that the oil injected thereon might give forth its vapor, consequently waste of fuel in the reheating was reduced. The periods of "blast" and "run" became shorter. Water gas making was being understood. A few years elapse and present day practices are before us.

We who thought a gradually increasing heat from carburetor to superheater outlet of utmost importance then are inclined to almost reversed conditions now. High pressure blowing, which was thought the main factor in attaining heating effect, of our generator gases then, has given place to moderate pressures, and *producer gas of value* is the result now.

The writer has recurred to a few changes in operative methods. It is fair to assume, in view of the benefit derived, that they have had much to do with economy in production; but it would not be fair to infer that this is the direct cause or effect of our progress. Without the various improvements in apparatus of recent years to assist us, present day results would not have been obtained.

Only one ruffle appears on the otherwise placid surface of the later manufacture of water gas, and, queerly enough, oil is the element through which and by which the surface may be smoothed. Without entering into or questioning the wisdom of the course pursued by our suppliers of enriching material, the fact remains, and is painfully apparent, that the increase in price of their staple has brought us face to face with a problem we must confess we had not thought of. It is a problem which deserves of the consideration of all, irrespective of whether we have water or coal gas plants in our care. It has been asserted that the solution or remedy for this present difficulty is in the curtailing or reduction of water gas produced, and that our product be composed of equal portions of each. Output of works must certainly be taken to account, in considering the above proposition. To work to advantage in either respect the make must be near the capacity of benches under fire, or the particular set of apparatus used.

The construction of coal gas benches will not allow of the intermittent firing up and letting down, and to maintain heats while retorts were inactive would be the height of wasteful folly. Many of us no doubt are hesitating, and with reason, as to the proper course to pursue. We remember and reflect on the incentives which compelled us to abandon the manufacture of coal gas (universal then) and install water gas in its place. Memory brings back the prettily persuasive arguments of water gas projectors. You remember the period. Our tar wells were filled to overflowing and flowing over. Our coke shed was filled to its capacity, and we were ready to welcome any relief which offered towards the abatement of our "tar nuisance" and the reducing of our coke pile. We became enamored, and were converted. And now in the light of our experiences then the question arises: "Will the same conditions prevail later?" Who can answer? The doctrine of supply and demand must govern. Tar wells are overflowing now as then. You may say that location of works is the probable cause of this. Should location affect the sale of any article really in demand? and we answer in good faith, "No."

If the manufacture of coal gas should be taken up to the exclusion of water gas, would it not mean overproduction of the principal products, the *sale* of which pertain to the reducing of cost. We answer again in good faith, "It would."

There is cause for alarm in water gas manufacture we acknowledge, but we have not satisfied ourselves in regard to the minimum cost of producing. We remember then. Compared with coal gas it is as youth to old age. It has had a rapid and healthy growth, and has not yet reached the settling down point. Much more is expected than we have received. Improvements have followed its "growing up," each in turn adding to its strength. On the contrary, although improvements have been made in coal benches, the yield per pound of coal used was practically the same, then as now. In conclusion, therefore, to compensate as it were for the labor and coal items, so largely important to the make up of coal gas, by products must of necessity become more valuable before it will stand alone. To venture a prophecy—it is within the scope of this paper—the flexible apparatus will come, making possible the producing of the old and the new, either or both, as required. One unit, two products. Mixed, the gas of later.

Discussion.

The President—Gentlemen, I am sorry that Mr. Waters is not here to hear your approval as expressed by the applause. It is a matter of very great interest, looking back to the times 30 or 40 years ago (possibly this paper does not go that far back, and I do not propose to go that far back in my own memory) to have these facts noted for us to pick up the threads and see what has been. It is very valuable to us when, turning over the problems in our own minds in preventing us from unconsciously possibly taking up something that has been, and getting that same experience over again. I am sorry I did not know the contents of this paper, as I picked up some old proceedings of the seventies a few days ago. I had intended referring to it in my presidential address, but I felt that I was tiring you as it was, so I left it out. But $12 a ton for coke was very attractive. It was not quite so attractive to hear that you paid $12 a ton for coal, but the prices of gas were exceedingly attractive compared with the present condition. I won't mention them, because I don't want to turn your minds backward quite so far. Gentlemen, the paper now is before you, and I am sure Mr. Waters would be glad of expressions from the members on it, and if he comes to-morrow we will ask you to repeat any apt questions that may be asked. I might say that Mr. Waters might be privileged to reply through the JOURNAL. I presume that would be a proper way.

OPENING OF THE QUESTION BOX.

The President—If there is no objection to going out of the regular order, and as we have but 15 minutes before recess, I suggest that the Question Box be opened. The first question was one that we hoped Capt. W. H. White would reply to, but the Captain unfortunately was called away. The question is:

"What successful substitute for cast iron gas mains has the high price of iron developed?"

Mr. McGregor—I think Mr. Shelton answered that question very well.

The President—I think that reply is very apt.

The Secretary—I would like to say that I have had my feelings very much hurt in the treatment of questions that I have put into the Question Box in other Associations than this, and I sincerely hope the New England Association will treat the questions with courtesy and consideration. I think most of the questions are put in in good faith. Certainly, if I put in a question and it was treated with levity, I should feel hurt officially and personally. I hope this Association will treat the questions from the Question Box with all the consideration which they deserve.

Mr. Shelton—The Secretary appears to have been suddenly hit by something, and as he seems to feel that the comment made on that question so far has been possibly not very relevant or quite fair to it, I will try to add a little to the discussion, simply as a matter of record. I do not know of any substitute for cast iron pipe that has been actually used to any extent. In the past year I have had occasion to look into it quite a little and I have not found anything that I felt warranted by precedent and the use of others or by my own conclusion in thinking would justify my departing from either cast or wrought iron. The price of wrought iron has not been any relief from the price of cast iron; if anything, it has been worse. Mr. Butterworth, of Columbus, O., proposed at the Western meeting last year the use of terra cotta pipe, or Mr. Doherty, I forget which. I do not understand that any installation of that has been put in, or that any information is available as to how such stands up to its duty under actual work. In Philadelphia, about a year ago, a glass pipe was advertised quite freely, and its strength and cost were promised as being respectively equal to and somewhat less than cast iron at $20 to $25 a ton. I think it had some very attractive features, especially as against electrolysis, but it never got beyond the point of the prospectus. It has not materialized. A good many of us in that neighborhood wish that it would materialize, as the machinery designed for making it was very attractive and complete, and promised to turn it out really at low figures. Mr. Nettleton spoke a short time ago of a wrought iron pipe covered with cement for use by water companies. I might add that in Philadelphia, at least in that neighborhood, is a concern that makes very considerable quantities of that pipe, and it is used by them for their own associated water works almost entirely. They are not in the gas business to any extent, and I do not understand that it has been used outside of water, but as a practical, everyday substitute for cast iron pipe, for such use it is certainly something that has been used to a large extent, and is doing the work first rate. They take a sheet of wrought iron, about an eighth of an inch thick, roll it into pipe form, line it inside with cement, and cover it outside with more cement, so that the sheet iron is absolutely

protected, as far as corrosion is concerned. both inside and out. They then cover the outside coating of cement with a final coating of thin iron, which is simply for appearances and to protect the cement in shipment. They expect that the thin sheet iron coating will shortly rust off in the ground and leave the solid cement, which they are depending on as against corrosion, and the wrought iron within, which they are depending upon for strength. That pipe has been used in the instance of scores of miles very satisfactorily in water, and it seems to be a good substitute for cast iron in that business. I have yet to learn of its being tried in gas.

Mr. Mansfield—The coated pipe that Mr. Shelton speaks of is a vast improvement over the original cement pipe with the single coating of iron outside of it. I have seen the two used together frequently. Take the pipe that has a single coating of cement inside, with a single layer of sheet iron outside. If when that is laid there is any break in the cement or the cement is anyways porous, in a very short time the iron will pit so badly that it will begin to leak to a greater or lesser extent. But this pipe that Mr. Shelton speaks of, even if when it is laid it is not so carefully coated, will last very much longer than the original type of cement pipe with a single coating of iron outside of it. Those who have at least 30 years' experience in the use of it claim it depends entirely on the outer coating of cement finally given to it when laid in the ground.

Mr. Coggeshall—I was in Nyack, N. Y., three or four years ago where they were laying wood pipe, prepared by some wood impregnation process, and they had a guarantee of 10 years from the pipe manufacturers. I had some correspondence with the manufacturers of the pipe as to the guarantee. I am pretty conservative, I never used any of it; but they were using wood pipe in laying gas mains in Nyack at that time.

Mr. Nute—I had a little experience about 12 years ago with the pipe Mr. Shelton speaks of in the use for gas. We laid, as I recall now, about a quarter of a mile of 10 inch main in this service. The company sent on an expert to see that it was properly laid. The pipe leaked from the time it was put down, in fact the leakage was considerable. It continued to leak worse and worse, until, a very few years afterwards, it was taken up and replaced with cast iron pipe. Though I appreciate that such pipe is successfully used for water it did not seem in that case that we could use it for gas.

Mr. Shelton—Joint leaked, or pipe leaked?

Mr. Nute—Both. They did not make the joints tight or the seams along the pipe. It leaked at intervals along the length of the line.

Mr. Shelton—It is only fair to the pipe to say that this pipe has been improved since, because I know that that *pipe* cannot leak, what ever the joint may do.

The President—I want to suggest a possible explanation. If you test any pipe, valve or apparatus of that kind with water and find it tight and then test it for gas you may find it indicates a leakage. If you made the original test at your works with air, I think you might find that pipe tight, where you would not find it so in the case of a test with water.

Mr. Harbison—I would like to inquire of Mr. Shelton whether the joints of the pipe to which he alludes are of the socket or sleeve type?

Mr. Shelton—It is substantially with a coupling or sleeve, covering the joint, and made up with cement on the lines of our cement joints; a sleeve that laps the two ends of the pipe in its center.

Mr. Barnum—I was fortunate enough to see a 40-inch water pipe filled with water last summer, and I happened to be at a joint that was uncovered. When they were filling it a rush of air came out, which would have come out of a leak in a gas pipe, with a few inches of water pressure, but when the water came it was absolutely tight.

The President—That is an interesting statement. Now, gentlemen, we are within five minutes of the recess hour, and I don't want to keep any of the members from the necessary time for dinner. I would say that it is proposed, unless any members make suggestions to affect the decision, that immediately after the reassembling the topic of "Oven and Retort House Construction and Results" will be taken up. Will you kindly bear this in mind?

A recess was ordered to terminate 2:30 P.M.

First Day—Afternoon Session.

The Association reassembled at 2.30 P.M. The President called for reports of committees.

Mr. C. F. Prichard submitted the following

Report of Committee on Nominations.

Your Committee on Nominations would respectfully report the following names for office bearers for the ensuing year:

President—Walter R. Addicks, Boston, Mass.
First Vice-President—Waldo A. Learned, Newton, Mass.
Second Vice-President—Wm. E. McKay, Boston, Mass.
Secretary and Treasurer—N. W. Gifford, New Bedford, Mass.
Directors—F. S. Richardson, W. G. Africa, Wm. McGregor, Joseph E. Nute and Wm. H. Snow.

Election of Officers.

On motion of Mr. Neal the report of the committee was accepted, and, on motion of Mr. Slater, Mr. H. B. Leach was named to cast the ballot of the Association in favor of the election to office of the gentlemen named.

Mr. Leach cast the ballot as directed, and reported the result.

The President in declaring the election said: Gentlemen—I would have been very glad to have gone on and surrendered the position to my successor. I have to say, however, that I appreciate the compliment of a re-election, and I thank you for it. (Applause.) We will now take up the subject for discussion announced before recess, the short topic,

OVEN AND RETORT HOUSE CONSTRUCTION AND RESULTS,

and I will ask Mr. Louis J. Hirt, Chief Engineer of the New England Gas and Coke Company, and of the Massachusetts Pipe Line Company, to open this discussion.

Mr. Hirt—Mr. President and Gentlemen of the New England Association: I thought the best way to open a discussion was to put it on paper. If you had asked me to do that a year ago I would have had to speak about anticipations, but to-day I am pleased to state I can show you some results. Those who are acquainted with our works know now that about seven-eighths of it is running, and we expect to have it in full operation by the 1st of March. In this paper I assume you all understand the general arrangement of our works, and am not giving a description thereof, but merely trying to compare it with the ordinary, plain, everyday gas works; or, better yet, with the through retorts.

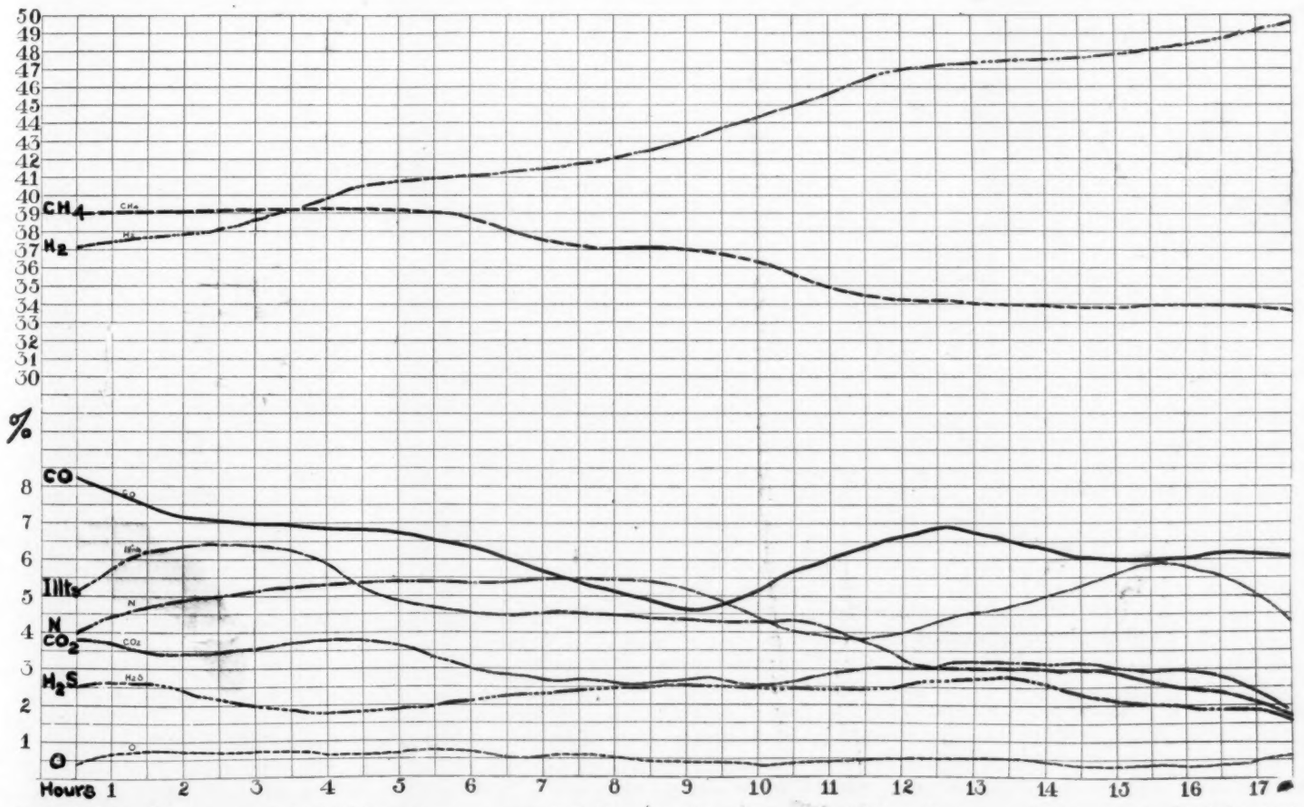
The general construction of the Otto coke ovens differs but very little from the through retort coal gas construction, especially where liquid or gaseous fuels are used for heating the retorts. The ordinary through retort has a capacity to accommodate a charge of 600 pounds, while the Otto coke ovens (referring to those at Everett) have a capacity to carbonize six tons of coal at one charge. Once the coal is in the ovens the operation is practically the same, and differs only in what is the essential point to us—namely, to make a heavier or more dense coke than it is possible to make in the ordinary coal gas retort. In the through retort the coal body averages not over 9 inches in thickness. The heat can attack it from the four sides; namely, the bottom, two sides and the top. If it is a D shaped retort, it may be said that the heat attacks it at all points at once. Therefore, the action of the heat, being practically the same at any point radiant from the center of the mass of coal, the quantity of coal fluxed at the same time is nearly the whole amount of the section of the layer of coal in the retort. The lighter hydrocarbons are expelled in a much shorter period of time where the coal is attacked by the heat in such a manner. The effect of this action is to produce a very spongy, soft coke. While the penetration of the heat in the vertical Otto retort is similar to the through retort, the action of it on this large mass of coal is much slower. The side walls being proportionately larger in area than on the bottom or top, the action of the heat (especially due to the way the heating of the flues of the ovens are constructed) takes place mostly from the side, and the coal is almost entirely carbonized from the two vertical sides. The heat fluxes the coal next to the wall first, then forms the first cells, and as the action of melting the coal creeps in towards the center of the mass, in steps, averaging about one inch in depth—and as long as there is fresh coal ahead of the fluxing part—the fluxed coal is more dense and is a heavier, plastic substance, and stays so as long as there is fresh coal ahead to supply the flux; but the moment the fluxed parts meet in the center the remaining inch or inch and a-half of the coal when coked becomes of a spongy nature and makes a fac-simile structural coke to that made in the ordinary gas retort. Carbonizing the coal in this slower manner clearly demonstrates that there must be a greater amount of carbon left in the coke, it being much denser, and of course evolving a smaller amount of rich gas per ton of coal than is done in the ordinary gas retort.

The application of the heat to the Otto retorts is very similar to the latest designs of the through retorts, and the only difference in heating effect can be the thickness of the walls. In our case the walls are 3½ inches thick, through which the heat has to penetrate to attack the coal, while in the through retort it seldom exceeds 2½ inches, and as

tests have not been made to show the exact results, and though there may be admitted a slight disadvantage in the thicker walls, I think it is offset with the less expense the coke oven plant has in the handling of the material over the through retort, and that this more than compensates for that slight difference in heat efficiency. Our retorts take a charge of 6 tons of coal, and the construction of the Otto ovens allows us to charge the retorts from above. The average time to charge and discharge an oven is 10 minutes. Of this but 4 minutes are allowed for the pushing of the coke, 1 minute for the closing of the doors, 2 minutes for the charging of coal, and 3 minutes for leveling.

The average charging time in a gas works having Otto retorts is about 10 times less than the best retort practice, using equal quantities of coal. Once charged these ovens will remain undisturbed from 26 to 28 hours (according to the heats of the oven), while the ordinary gas retort has to be charged and discharged every 4 to 6 hours. Most of the work can be done by mechanical means, and the saving of labor per ton of coal handled is one of the greatest and most important advantages we possess over ordinary gas retort practice. As to the production of gas. There should not be any difference in the composition bearing the difference of carbon remaining in the denser coke than there is in any gas retort system. The through retort has to be air tight, and if the Otto ovens are air tight there is every reason to believe that just as good gas can be made in them. So far our furnaces have not shown the slightest trouble in leaks; in fact we feel that they are getting tighter every day. The porousness of the walls is being carbonized, and they are filling themselves so as to make very tight retorts. We have been very careful to keep the heats at an even temperature, and find that the elasticity of the brick work is sufficient to take care of the unavoidable effect of cooling that the fresh coal has upon the walls. As regards tight retorts; they have come up to our expectation. Our coking time being a much longer time than in the ordinary gas retort gives us a chance to manipulate the gas with much more exactitude, as a similar amount of the time is a small part of the percentage of the total; so that in separating the rich from the poor gas, a few minutes, or even an hour, make but very little change in the general illuminating power results.

To produce the 18 candle power illuminating gas we are now distributing, we run the gas from the ovens for the first 10 hours of the period of coking in the rich main, and the remainder of the time in the poor gas main. In the chart, Fig. 1 shows the result of the gas for the first 17 hours, and plainly illustrates the quality of the illuminants in the gas for the first period, which you will find is considerably higher than the average of the ordinary gas works, where the whole of the gas flows into the same main. The quantity of surplus so collected is governed entirely by the amount of poor gas required to heat the ovens. To regulate the running of the ovens properly, we found by experiment that 10 hours out of 28 is a good average, and to make it absolutely sure we run the ovens 10½ hours to 11 hours on the rich main, and when the poor gasholder drops by-pass some of the rich gas and so make up for the slight deficiency. As this device is automatic, the works are entirely self-governing as to the surplus. In cold weather the cooling effect of the external air on the battery is a trifle greater than during warm weather, and in that case the by-pass is open longer, showing that more gas is used to keep up the required temperature of the ovens. In some cases we reduce the 10½ hours to 9½ (in very cold weather), so as not to by-pass any more of the rich gas than is absolutely necessary to keep up the balance. To provide against the extreme cooling effect in very cold weather, and an increasing demand of illuminating gas, we are now installing a producer plant in which we shall make producer gas from coke breeze of about 140 heat units, and thus replace the heat value taken by the increased demand of illuminating gas above the actual surplus. Should the increased demand of the illuminating gas reach the limit, which is the whole of the gas in the coal, our candle power would become about 12-



candle power, against 18 candle power, at 50 per cent. of total output. It would then be necessary to install an enriching plant. Thus, the works will be very elastic as to the production of illuminating gas, and it will be only a question of forcing or diminishing the production of the producers to make up the variable consumption of the poor gas heating the ovens as the outside temperature and illuminating gas demand require it.

We depend a great deal on our by-products for the financial returns of the plant. The tar, ammonia and surplus gas are, in the order named, our principal by product. The plant has been designed in such a way as to produce these with the least amount of labor, and every detail has been well taken care of to bring all losses to a minimum point. The sulphate house, we feel, is the best of its kind, the result surpassing all expectation—the sulphate being always of a uniform color and standard of ammonia contents. The location in Boston for such a coke plant is especially well adapted. Hard fuel is high in price, while soft coal can be bought at a comparatively low price, and the present market has been favorable to our conditions. The coke as a fuel has taken very well, has proved itself efficient, and is liked wherever economy is desired. The tar has been disposed of for several years to come. The sulphate has been in enormous demand, and our product promises to be the standard article of the country, on account of its uniformity in

composition and color. The gas, as most of the members well know, has been very satisfactory in every respect. While it is a well known fact that the coal we are using contains a great deal of sulphur, we have been able to keep the sulphur far below the Massachusetts legal requirement with six double boxes, and we are now putting in our purifying house six more, so as to give a better chance to work the lime to its full absorptive capacity.

I think when this chart is published, which I understand it is going to be, it will give you a good resumé of what the works have done on the 17th of this month. (Applause.)

Table of Present Operation of the Works, February 17th, 1900.—Consists of 300 coke ovens making coke; 50 coke ovens heating now being charged. The last 50 coke ovens almost completed, will be ready to make coke the 1st of March.

The present output is scheduled on 29 hour time—an average pushing of 250 ovens per day, equal consuming 1,500 tons of slack coal, making 1,000 tons of coke in 24 hours.

The by-products are: 67 tons of tar; 16 tons sulphate of ammonia, and 4,500,00 cubic feet of 19 candle power gas. Consumption of lime, 16 tons per day.

Analysis of Gas, Taken Feb. 14th, 1900.

Period.	H_2S	CO_2	Illuminants	O	CO	CH_4	H	N
2nd hour....	2.7	3.5	6.4	.8	7.	36.9	37.9	4.8
7th hour.....	2.4	2.7	4.9	.6	6.	36.93	41.57	4.9
14th hour...	2.7	3.1	3.0	.6	6.3	33.72	45.89	4.7

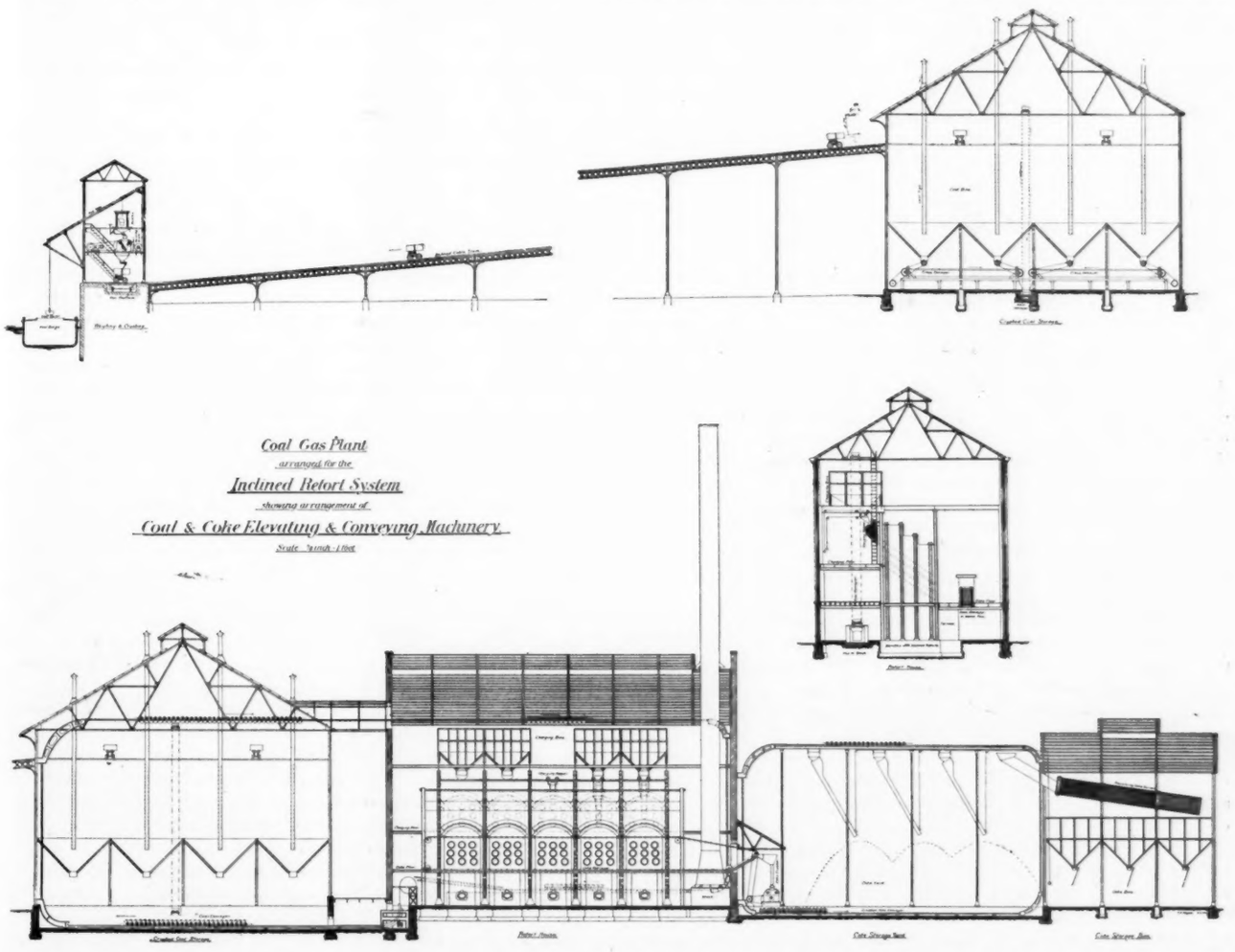
The President—I think we can congratulate ourselves over hearing for the first time the results and facts from one who knows them, instead of talking in the air as we have been doing for months, and practically for the past two years. It was intended to make this a continuous topic and have the discussion afterwards. I would like to have some expression as to whether you would like to discuss this portion, and then go on to the next, or have the four gentlemen say what they have prepared and then discuss it generally. I think it would be better to have them all go ahead, combining the discussions. If there are no objections, I will ask Mr. Fred. Mayer, of Baltimore, to address us. I want to thank him particularly. He has come from Baltimore at considerable personal inconvenience. I had to get him on the long distance telephone finally to get him here at all.

Mr. Mayer—Mr. President and Gentlemen of the Association: I came here entirely unprepared for the subject upon which I am requested to make a few remarks, and upon a special invitation of your President, to whom I am very thankful for his kind remembrance. As I am extremely busy at this time of the year, I was hardly able to leave my business, and for that reason was absolutely unable to find time for the preparation of any paper. I shall, therefore, only make a few general remarks referring to the inclined retort system. Through an extended trip to Europe, of over four months duration, two years ago, I investigated very thoroughly the inclined retort system, and, as a result of this investigation, I proposed to a gas company in Brooklyn, N. Y., for which I am building a new plant, the adoption of the inclined retort system. This gas company has no other source of producing gas, and is at present under contract with another large company for its supply of gas. The present contract expires on July 1st of this year. From this you will note that, upon the expiration of the contract, the gas company will have no other source of producing gas, except that received from the inclined bench system now in course of construction. That I am well satisfied of the producing capacity of the new plant with inclined retorts, and that this system will produce exactly what I told them it would, you can be assured of, as otherwise I should not have recommended the same. The inclined retort system is, in my opinion, a step in the right direction for the future production of gas in this country, providing the prices of oil will remain at the present level, or increase to a higher one. In the system of inclined retorts there is no claim made, as you probably know, for a greater production of gas per pound of coal, or that there will be obtained a greater amount of by-products than with any other bench system of good construction, but that there will be a decided reduction in the retort house labor, there will be no question. In determining the system that would be best adapted for the purpose of the company to which I referred a few minutes ago, and the plant for which I am now constructing, I made a careful investigation of the various systems of coal gas production. The production of water gas was not considered, and entirely excluded on account of the present high prices of oil. The plant, however, is so arranged that a water gas system may be added at some future time. To determine which is the best coal gas system to install, it is absolutely necessary, in my opinion, to consider the cost of construction and the cost of operating in conjuction, to which must be added a fixed interest charge of the same amount in all instances. Without the addition of such fixed interest charge, the proper value of the plant and its efficiency cannot be arrived at. I have with me the calculations which were made at the time that the system of the producing plant of the works above referred to was considered. I have had no opportunity to examine them since the calculation was made, and shall have to look over them for a minute to refresh my memory. The question under consideration was the production of approximately 700,000 cubic feet of gas per day, and I found that for such installation there would be required, at an assumed rate of 5 cubic feet of gas per pound of coal, either 12 benches of 6's, with full-depth regenerator furnaces, 8 benches of 9's, with similar furnaces, either charged by hand in the ordinary manner, or supplied with charging and discharging machinery, or 5 benches of 9's with inclined retorts constructed under the Coze system. I found that, by applying the same price of coal in each instance and the same wages for the various men in the retort house and for handling the coal, for a time period of one year, *i. e.*, 365 days, and allowing in each instance a fixed interest of 6 per cent., the following: In the system containing 12 benches of 6's, the total cost of construction, which included the benches with full-depth regenerator furnaces, the retort house, with charging floors, etc., complete, that the cost of the entire installation would be $53,136, or 22 46 cents per 1,000 cubic feet. I further found that with this plant the cost of operation for retort house labor only, including the handling of coal and coke, would be 8.75 cents per 1,000 cubic feet of gas. From the above you will note that the total amount of cost of construction, plus the cost of operation, including interest charge of 6 per cent., amounted to 10.04 cents per 1,000 cubic feet of gas produced. With the 8 benches of 9 horizontal retorts having full-depth regenerator furnaces, the total cost, arrived at in a manner similar to that described for the 12 benches of 6's, amounted to 9.4 cents per 1,000 cubic feet. These same benches supplied with charging and discharging machinery showed a result of 6.61 cents per 1,000 cubic feet, whilst that for the 5 benches, with 9 inclined retorts, under the Coze system, showed a result of 5.2 cents per 1,000 cubic feet.

Mr. Lamson—That price was with charging and discharging machinery, of course?

Mr. Mayer—The charging and discharging machinery was applied in the one instance of 8 benches of 9 horizontal retorts only, and showed a result of 6.61 cents per 1,000 cubic feet, and whilst this amount does not differ a great deal from the results obtained for the system with inclined retorts, I wish to state that, in the calculation of the efficiency of the inclined retort system I have applied the lowest factors possible, for the reason that these figures were to be submitted to the Directors of the gas company, and I intended to be on the safe side with reference to the results to be produced, providing the system of inclines was adopted. In all of the above instances of various systems with horizontal retorts, I applied factors rather above the average value of the cost of construction and results as at present obtained in ordinary retort house practice in this country, and I feel sure that the results which will be obtained with the inclined benches will prove by far better than those shown in the above referred to calculation. The retort house labor alone for the inclined retort system in this case amounts to 3.48 cents per 1,000 cubic feet, but as I have stated before, this cost is based upon higher factors than those which will be applied in actual practice. The higher factors were applied for the simple reason that, in the matter of determining the best system for the interests of the gas company, I represented a manufacturing concern which our bound to make their word good upon the completion of the plant, by the production of such results as they have guaranteed. The coke consumption in benches with inclined retorts, which I am now constructing, I do not expect to amount to more than 15 per cent. of the coke produced for the average of the year. Gentlemen: I am at present placed in rather a peculiar situation. As you know, I am the representative of a manufacturing concern and do not wish you to think that I came here for advertising purposes, and for that reason I trust you will excuse me if I abstain from further remarks about the details of construction of benches with inclined retorts and its advantage over all other systems. But with regard to results which are expected from the installation, I desire to state that, as the plant has to be in operation not later than the first day of July, and will produce, beyond a doubt, at least such results as we have guaranteed, or perhaps better, and as this date is only a few months distant, I shall be better able to advise you in the near future and before the expiration of this year, of positive facts and results obtained, which I am sure will be more acceptable to you than any claims for expected results that I

might make at the present date. When such results have been produced they will not be open to discussion as any claim for expected results would be at the present day, simply because they will at that time be undeniable, positive facts. In accordance with the request of your President, I have prepared in a great hurry a sketch showing what I might term a typical presentation of a coal gas works having inclined retort system. By an examination of the sketch you will observe that, with this system of gas production, coal may be handled and converted into coke, absolutely without any human labor, providing the conditions would be such that coke sales would be in the same ratio as the coke produced, minus such portions that are used for firing the benches. I understand, of course, that such condition cannot always be expected to exist, and in all probability will be rarely obtained. However, it shows what can be done under the new system. By referring to the sketch you will note that the only handling of coal (and I may say that in this sketch the principal details of plant I am now constructing are incorporated), will take place at the time the coal is received at the dock or wharf of the gas company. The coal will be handled from a barge by hoisting to the upper portion of a tower specially constructed for the purpose, to be weighed upon a scale, then to be transmitted into the crusher and from there to a hopper underneath the crusher into coal cars, to be conveyed directly to the coal storage shed, which latter will be constructed with inverted cone shaped bottoms, all suspended above the ground with sufficient clearance to permit of walking underneath them. From the coal shed the coal will be taken by cross conveyors into a central longitudinal conveyor, and from there to the end of shed to be deposited upon the retort house conveyor, for the purpose of elevating the coal directly into the overhead storage bins constructed above the benches. The coal will be supplied from the overhead storage bins in retort house by means of automatic charging chutes to the inclined retorts, and the coke will be drawn from the lower end of the retorts into a trough, filled and constantly supplied with water in front of the benches, to be transferred by a conveyor of special design to the end of retort house and outside of same. The coke after leaving the retort house is at once passed through a crusher of proper design to reduce the size of same to become available for domestic purposes. From the crusher the coke is passed by the conveyor to a screen having various sized openings, to be deposited in overhead bins, according to the size. If the coke sales should not be in the same proportion as its production, it will be necessary to by-pass the coke pockets, which can be readily done by a simple arrangement, and the coke will then be deposited in the coke yard, to be taken from there some future time in the overhead pockets, before referred to, to be conveyed from there by a gravity discharge to the coke carts below. (Applause.)



The President—If Mr. Mayer realized the intentness with which he was listened to by every one, as I particularly observed, he is well repaid for coming to talk to us. Will Mr. Ramsdell, of Philadelphia, now come forward?

Mr. Ramsdell—I feel a little embarrassed in the present situation, for it would look as though I am placed in the position of defending the horizontal retort, and I don't want to be so understood. I believe that all three have their proper sphere.

The President—Excuse me, Mr. Ramsdell. I want it understood that the idea was to present all sides of this question, not necessarily that we are defending one kind or another.

Mr. Ramsdell—I did not mean anything personal at all. No subject was assigned to me, as far as that is concerned. I was simply asked to be prepared to take part in the discussion on this important subject. I have studied a good deal on this subject of inclined and horizontal retorts, and I must confess that I am not yet quite clear as to which I would advise. As I said before, I think there is a place for each of them, and I think the location has a good deal to do with that point. As far as our Company is concerned, we are in the market for both. I don't propose to talk from the construction end of this at all; I am simply talking now as a gas man. This question came up in our own business in the rebuilding of one of our plants. While there were some reasons that prevented us from giving it as full discussion as we would have liked, yet we decided against inclined benches, although we were building a new works. That was very largely on the ground

that we would have to do a good deal of experimenting, or at least were afraid we would, and also from the fact that we were very short of time in which to complete the plant. The first installations of these inclines will of course take longer than later ones, for various reasons which are very easily understood by any gas engineer. We have a man at the present time in Europe making a thorough investigation of this whole subject, and I hoped he would be back prior to this so that I could have gathered information from him to talk a little more intelligently, but I am giving you the benefit of what I know up-to-date. We found that, as near as we could make out, the results obtained were practically the same; that is to say, with a modern retort house, built in the most approved, up-to date fashion, with machinery, the residual results and cost for labor were practically the same. The cost for hand labor with horizontal retorts is from 8 to 10 cents per 1,000, with drawing machines alone, from 6 to 7 cents, with drawing and charging machines from 3½ to 4 cents, and the cost of labor with the inclines is about the same. Our investigations show that they have never reduced this more than a third of a cent below the 3½ to 4 cents. As far as the cost of construction is concerned, I think all of these costs should be compared on the cost per 1,000 of capacity, and not per retort or per mouthpiece. It is very misleading to figure up the cost of a gas works at so much per mouthpiece, whereas if you take the capacity per 1,000 feet produced the comparison is fair. I have no figures that I would want to quote here offhand on the costs of the different plants. One factor in the matter of inclines may be important in our larger cities or in any community where the conditions are such that the space available is limited. You can undoubtedly make more gas per square foot of area with inclines than you can with horizontals. The horizontal bench of to-day, the modern up-to-date bench, is of very large producing capacity, but at the same time with the inclines, as you can very readily see, you can get a longer retort in the same space, and therefore get a greater capacity. But outside of that it seems to me the honors are comparatively easy at the present time. We don't know as much about the inclined bench as we will a year or two later.

The President—I did not know, when Mr. Ramsdell wrote to me to say he was particularly interested in a matter of this kind, that we were going to be so fortunate as to cover the ground as well as we have. I hope that if we can't attend the American meeting in a body the New England Association will be largely represented at Mr. Ramsdell's meeting next October. Now if any other gentleman will please volunteer. Perhaps a limited number of questions may be answered, but I should not be disappointed if the gentlemen would say, as we used to say at school, "Not prepared." I congratulate the gentlemen that they covered the thing so thoroughly.

Mr. Wood—I would like to ask Mr. Hirt if they have ever taken any temperature test of the charge in the retort; if he knows practically or approximately what temperature they maintain in the retort.

Mr. Hirt—No; we have not taken any pyrometric temperatures at the ovens in our plant, but it has been done in others. We desire not to exceed 1900° F. in the ovens to make the gas we are making to-day.

Mr. Nettleton—I would like to ask both Mr. Hirt and Mr. Mayer if they have gotten far enough in their investigations to say with any degree of certainty how small a gas works can put in either a coke oven plant or inclined retorts. I think most of us in the room represent works with a sendout of less than one hundred million, and whether a works of that size can use either of these systems has been a question in my mind.

The President—Mr. Hirt, will you answer first, if you are prepared to?

Mr. Hirt—A plant of about 20 ovens is the smallest I would advise any one to put down. We have in Halifax a plant of 10 ovens that runs very satisfactorily; but I think 20 would be better.

Mr. Nettleton—May I ask what is the production of gas available for sale from 20 ovens?

Mr. Hirt—It depends a great deal on the coal that you have to make gas from, what weights of oven and what kind of coke you have to make. If it is a very hard foundry coke it takes a little longer to run; it may make two or three hours' difference in the plant. If it is a coal that has very low volatile matter, it makes more coke than it makes gas. All those things have to be taken into consideration. But take it with the coal at Halifax. They are making there about 70,000 to 80,000 a day, I believe; sometimes more. Mr. Addicks can tell you more about it than I can. All I can say in regard to 10 ovens, as far as the labor is concerned, which is really the point I wanted to make, is that it is just as cheap for you to run 20 ovens with labor per day as it is to run 10, for a series of men in 10 hours can push 20 ovens for the same money. It takes so many men to do the work that they will push at 10. If there is any way at all to sell the coke I think there would be more profit in a 20 oven plant than there would be in a 10-oven.

The President—I think, in reply to Mr. Hirt, it was somewhere between 150,000 and 200,000 a day, but I don't remember distinctly. I would not like to have that stated as a fact. Mr. Mayer, do you care to say anything? Please feel perfectly at liberty not to say anything. I expressly stated that to you.

Mr. Mayer—To the question of Mr. Nettleton I desire to state that I have no personal opinion at present, and cannot until we have produced results from our own coal and under our own conditions. I don't know but that our coals may vary in the results as compared with the German or English coals, but I do know that, in one place in Germany where the installation of benches with inclined retorts was under consideration, it was decided to erect one bench of 9's instead of several benches of 6's, and from this decision I judge (I have not the exact figures in my mind at present) that the production per day of this works was not over 150,000 cubic feet. I have been informed that the installation has given great satisfaction regarding economy in retort house labor, as compared with the old installation of horizontal benches with 6 retorts.

Mr. Ramsdell—Mr. President, could I now say one thing that I forgot to mention when first speaking. I don't want to be considered as talking shop here at all, but I do feel like calling attention to the point that has been made here recently of the results in the coke oven processes. It seems to me that the strongest point brought out by the coke oven people is the very high candle power which they have obtained by a simple manipulation of the gases; in other words, of taking their gas at certain periods of the carbonization. This seems to me possibly the weakest spot in our present system of coal gas making. A gas engineer about five years ago told me that in his judgment there was not less than 25-candle power in such coals as the standard gas coals, and I, as most any of us would, smiled and thought that that was a very extravagant statement. At the same time I believe now he was nearer true and correct than I was in my opinion at that time. His theory was that we robbed the gas of part of its illuminants as it passed from the retorts to the holder. The coke oven people have shown us that where they expected to get 12 candles, by simply manipulating that gas, they have taken out and put into their holder for distribution gas from 19 to 21 candle power. This shows we are possibly doing our gas making on a wrong theory; in other words, are we not making a rich gas and, because we do not handle it properly, robbing it of its illuminants and putting it into the holder so that it goes out to our consumers at a less candle power than we could get for the same expense if we simply handled it properly? I have heard gas engineers of good standing say it was impossible to extract more than 16-candle power out of standard gas coal. We know that is not correct, for we have done better than that, even with our present appliances. I believe the most important feature brought out by the coke oven people for the gas fraternity is to call our attention to this very point. They have shown us that in our present manipulation of the gas from the retort to the holder we are robbing it of part at least of its illuminants, and we are under obligations to them for this development.

The President—Of course Mr. Ramsdell has to keep in mind that there is a smaller number of feet put into the holder at this higher candle power.

Mr. Ramsdell—I understand that; but that does not affect the principle.

Mr. Fowler—Mr. President, some years ago (it was really before I came into the gas business), in a small works where I was interested I had occasion to experiment on the use of an exhauster. It was an exhauster run by a stream of water, very much like the steam exhauster, except that we used a stream of water instead of a stream of steam. For that purpose we ran a single bench for a certain number of hours at one time with the water exhauster and at another time with the water exhauster out of use. I found that the candle power of the gas as we made it was quite high during the first two hours, and during the last two hours of the charge it was quite low. As I understand it, it is that fact which the retort oven people are now utilizing; in other words, that the gas is rich which is first made from the coal, but poor after the coal has been in the retort for a considerable length of time. I don't undertand that they have proved that they have any ability to manufacture a large quantity of high candle power gas, but that they have proved that a certain quantity of the gas which they manufacture is of high candle power, and that portion they use for distribution as illuminating gas.

Mr. Coggeshall—I think on this point it would be practical to know

the quantity per pound of coal produced when it is taken off, up to and including the tenth hour.

Mr. Hirt—We have not been measuring it that way. Our plant is of such large capacity that everything runs by the ton. As far as the flow of gas is concerned we don't seem to find any difference from the first to the last hour, except we think—we have not been able to measure it—that as the gas gets drier towards the end the flow is a little sharper than it is at the beginning; but we have not been able to make any measurements. We have 50 ovens run into one main and all connected together. We are in hopes to connect up three ovens very shortly and make a test of such kind, but we have not been able to do it yet. Our main point now is to get the plant finished and running.

Mr. W. A. Learned—Did I understand Mr. Hirt to say he was getting between 2,000 and 3,000 feet per ton of 18 candle gas?

Mr. Hirt—As I illustrated in my introduction to this discussion we run 10 hours out of 28. That means a little more than one-third of the gas that we are getting an hour in each main, and say 60 per cent. of poor gas. Figuring it out in heat units, we get 45 per cent. Figuring it out in candle feet, we get 45 per cent. of the gas in the coal. That is, at the 18 to 19 candle power, we get about 34 to 36 now. That is the reason why I mentioned in my paper that should the illuminating gas demand increase we can still replace the heat units that we are robbing from the heat of the ovens by a cheaper producer gas, that cannot be transported in the streets but can be transported in the works, and so used to heat the ovens and still be quite a benefit and bring this charge down to this point. That is the very reason I explained that at the seventeenth hour, to show you whereabout the limit of illuminating gas is.

The President—I think we will have to close the discussion. It is getting after 4 o'clock and we have another paper yet to read. I presume I may thank these gentlemen for the Association (Messrs. Hirt, Mayer and Ramsdell in particular), and all the other gentlemen in general who have entered into the discussion, for the interesting information they have given the rest of us in this discussion. I would like to have the endorsement of the Association for the three gentlemen named. All in favor please say aye. (A unanimous aye was the response.)

Mr. N. O. Goulding, of Natick, Mass., then read the following paper on

FOUR YEARS' EXPERIENCE WITH PREPAYMENT METERS.

In the Spring of 1896 I was appointed Superintendent of a small gas works. The second day of my advent in town I was ordered by the Manager to cut off the gas supply to a certain person, on account of non-payment of previous gas bill. Being a stranger in town and not liking to make an enemy of one whom I found on investigation to be a user of gas to quite an extent, I suggested a prepayment meter, and two were ordered from well known makers. The same were set for the reason named above, and gave great satisfaction to the consumer and the Company. Since then I have set quite a number under the same conditions, and it has enabled us to keep business on our books that we could not have done with the old meter.

We now have about 40 prepayments set. As to their service, I find that about half of them have given me more or less trouble. Some would refuse to respond to the 16 to 1. Others have refused to pass the money. A few have been found wanting when the cash box was opened and the money was not there to any extent. In looking over my note book I find I have had trouble with 15 prepayment meters since April, 1896. This leaves me with about 25 to speak in praise of, and I should not want to sell them to any extent. But, oh! those 15. They have caused me to think many times that a prepayment was a snare and a delusion. Our bookkeeper is a lady, but when the cash does not balance who would blame if she spoke her mind freely.

I would say right here that we have had four makes of prepayments, and have had the same trouble with all makes, and I also find that we have the four makes in places at present that have so far given the greatest satisfaction, so that the manufacturers of meters who may be here at this meeting cannot take the credit of the good ones and leave those 15 on some small fellow.

Now, to close, I would say that, with all its faults, I love it still. And if these faults are remedied, I should place the prepayment meter with the Welsbach burner, as the two factors that will make our business flourish like a green bay tree.

Having concluded the paper proper, Mr. Goulding further remarked: In our President's address this morning, if I remember correctly, he stated that in his judgment it was not the mechanical part of the prepayment meter that would make it a success. I am not sure that I am quoting him correctly, but the substance of what I was getting at was that the mechanical part of it was not what he was looking after. If my paper and my four years' experience mean anything, they mean that what the small gas companies at least are looking after is a prepayment meter that, when we put it out to-day, to-morrow we know it is going to work just as well as the ordinary meter that we have been buying for the last 25 years. The prepayment meters that I set the last four years (those that were correct and have been correct all these months) were correct the day I put them up. I have never taken out a meter that was in three weeks or two days. The meters that I have found fault with, that I have had to remove and send back to the manufacturers and have them adjusted, have been the meters that refused to work the very moment we put them in. We have meters to-day that have given perfect satisfaction to the consumer and to the company from the day they started, showing that it is a mechanical possibility to make a prepayment meter that is mechanically correct. The point that I make is that it is in the manufacture of the meter itself.

Discussion.

The President—Mr. Goulding, if you will stay here you may have something more to say. I supposed that some one else would take a different view of what I said this morning in my address, and if that is the case I am perfectly satisfied. As President I assume that I must be entirely unprejudiced and unbiased. Now, gentlemen, this is a question on which I have no doubt everyone wants to get up at one time and talk about. If we can't do anything else we will call some of these meter people and ask them why it is.

Mr. McDonald—Mr. President, certainly I cannot help but laugh. I have not the slightest desire to talk shop at all here, and of course because of that I am exceedingly careful what I say. But I will relate a little bit of history. In the early days of the prepayment meter I sold to a gas company in Boston 50 prepayment meters. If that company will return them to me I will give it in return a bonus for them. This illustrates the idea that I think the gentleman has advanced in his paper. There are prepayment meters and then again there are prepayment meters. I think the people who have made prepayment meters have made mistakes. They were infants. They had to grow up. They had to have their experience. They sent out meters that were not what they ought to be. But I think I can without question tell the gentleman that to-day there are prepayment meters that mechanically are right. I don't think I need hesitate at all when I say to him one company in this country has over 50,000 prepayment meters in use, which is a large number, and there is no fault found with the mechanical construction of the meter. The company had the same troubles that the gentlemen who wrote the paper had, meters were in use that did not work. And they were made by all the manufacturers. It is not because one manufacturer more than another made meters that were better than another, but meters from all manufacturers gave trouble. But the days of trouble with prepayment meters have gone by. I can frankly say prepayment meters are made to-day, not only by my own concern but by other concerns, that are just as durable, just as sure to be accurate and to give just as little trouble mechanically as the ordinary meter. I think that I can say from what I know of the prepayment meters that are being made in this country to-day that the prepayment part of the meter is really just as reliable and more durable than the meter itself.

The President—I believe thoroughly in prepayment meters. We have had more or less experience with them and, as I have said before, I doubt very much if there is as much trouble mechanically with the prepayment meter to day as there was in the original gas meter when that was originally made and put on the market. There probably would not be one tenth the amount of trouble.

Mr. McDonald—Mr. President, might I go on a little farther?

The President—Yes.

Mr. McDonald—I have had a good deal of experience with prepayment meters, and have, of course, sold them to quite a number of companies. I can say to the gentlemen here this afternoon that all of the companies who have used the prepayment meter long enough, and enough of them to get an experience with their use, have become satisfied that they are a good thing. There is no question in my mind but that consumers can be obtained with the prepayment meter that cannot be obtained in any other way. I believe this will prove to be the experience of any gas company that takes the prepayment meter up and attempts its use. I feel sure that all will be well satisfied with its use as it is to-day, not as it was 4 or 5 years ago, when it was an experiment and when no one knew very much about it. But I know that the mechanical construction of the meter is such now that there need be no fear in attempting its use.

Mr. Goulding—Mr. President, my paper was written in response to our worthy Secretary's request for contributions some two or three months ago, probably. I am a firm believer in the business proposition of a prepayment meter to a small outlying district, especially where we have a small and rather poor class of people that otherwise we would not want perhaps to trust for two or three months' bills, or one month's bill. The last speaker said that the meter that we are buying to-day is not the meter that was made four or five years ago. I want to say that my Company has got the very first meter that it bought. It will be four years the coming April that we bought it, and I found by looking over our consumers' books yesterday morning that that meter was in operation to-day, was giving perfect satisfaction to the consumer, perfect satisfaction to the Company and myself, and was correct. We have meters that we bought last fall. Not over three weeks ago I had to send three back to be changed over and fixed, meters that were called modern meters. I remember about last March or April an agent for a meter manufacturer called on us with a model that he claimed was a perfect prepayment meter, and we ordered six; three of them had to go back. But four years ago we ordered meters from four different manufacturers of that day. I have four of them and they are all in working order to-day. The point I want to make is that the few meters we bought four years ago (four samples, you might call them), the first ones we ordered, are working to-day, have always been found correct and have never given any trouble to consumers. Of course, we are a small Company, and have only a few out in comparison with other companies, but we have never had to take a prepayment meter out of anybody's house or store, unless through death or removal or that the meter was not correct. The prepayment meter is what we want, as I stated in my paper, if we can get one that we can rely on.

The President—Mr. McGregor, we would like to hear from you in regard to prepayment meters.

Mr. McGregor—In connection with prepayment meters I am sorry I am not the last one to have something to say on this question. I have had a great deal of success with prepayment meters, and consider all the prepayment meter manufacturers my best friends. I think I have five different manufactures of prepayment meters. I have 1,336 meters in use to-day. My collections in two years amounted to $30,216.15; cubic feet represented, 20,144,100. The loss that I have figured from defective valves (valves not closing off after the quarter's amount of gas was consumed), and from breakages, of which I have had quite a number, and other causes only amounted to .49 per cent. I noticed in a paper printed in the American Gas Light Journal, a statement showing a 2 per cent. loss. I started to introduce those meters about 4 or 5 years ago, and the first meters that came out are not as good as the meters that we are getting to-day. The meters that we have had within a year I have absolutely no trouble with at all. The prepayment meter has been a great source of income to us. I have noticed with quite a little degree of amusement that if the gas could be sold for 15 cents more per 1,000 than the ordinary rate, it might be proper and becoming for gas manufacturers to sell gas through prepayment meters. Even if we lost 15 cents per 1,000, or if on the gas we sold we did not realize by 15 cents what the usual selling price was—the price that I sell at is $1.50—even then I consider it a first-class customer. A question was asked me some time ago by a gentleman who wanted to know the difference between the amount consumed by a regular meter and that consumed by a prepayment meter. I went over my list of 1,336 meters last month and found I had substituted 34 prepayment meters for regular meters. The average consumption by regular meters was 1,663 cubic feet per month, that by prepayment was 1,181 cubic feet of those 34, which showed a decrease of consumption of 29 per cent. in the prepayment meter over the regular meter. I would advocate by all means every gas man putting in prepayment meters, in order to accommodate a certain class of customers. I know certainly that the expense of collection and the trouble in keeping the meters in order are very much less than the 2 per cent. that the majority of authorities that I have read have given.

The Secretary—I would like to ask Mr. McGregor if he means to say it is his opinion that in ordinary practice the installation of a prepayment meter will reduce the consumption of the particular customer?

Mr. McGregor—Well, out of 1,336, I can only say that 34 of those meters that I substituted for regular meters show a decrease in consumption of 29 per cent. I think that a person is more careful. I stated two years ago I thought they would be a little more careless in consuming gas where the bill was not presented, but I really think they are more careful in consuming gas where they have a prepayment meter than where they have a regular meter. I would say that, out of these 34 customers, if I had not put in a prepayment meter, I would have lost the customer altogether.

The President—Mr. McGregor, I think that makes quite a different statement.

Mr. Nettleton—I should like to make a small addition to the discussion. I have been using prepayment meters since the fall of 1896, commencing six months later than Mr. Goulding, and uniformly these meters have given satisfaction. We now have something over 800 in use. Our income from these meters will exceed $12,000 this year. I am quite confident that a large part of these consumers would not be using gas at all but for the fact of having a prepayment meter. The majority of them, more than half, are people earning small wages. Most of them are living from hand-to-mouth. The bills at the end of the month with the ordinary meter would naturally run from $1.50 to $2, and they would find great difficulty in paying that amount. They do not find difficulty in putting 25 cents in the meter once or twice a week. With a few of the cases the bills are very much larger than with the ordinary meter. I have in mind the lunch wagons. I think we have 6 or 7 that we supply through prepayment meters. Those are run I think in almost all the New England towns by people who do not have a great deal of money. These wagons are paying from $125 to $150 apiece a year. Where formerly they had bills of $6 or $7 a month. There was difficulty in collecting, and I think in one or two cases gas was given up. Now the bills are larger and more easily paid. With that class of people the prepayment meter is admirably adapted both for them and for the company. It gives them what they want, it makes the paying of their bills easy, and, for the company, you are sure of your money unless the meter is robbed, and that in the small places is very rare. I think perhaps we have had three meters broken into in the 3½ years that we have been using them. Now, as to the trouble. We practically have none at all. The meters give us no more trouble than the ordinary ones. I remember, two or three years ago, somebody used occasionally to complain that the meter would not act, and we found they had not put in the quarter in just the right way, but that trouble has practically disappeared. We have found one case where the meter passed some gas without shutting off, but they are very rare. As I am giving the experience of three or four years and out of what is now over 800 meters, I believe I am warranted in saying we practically have no trouble at all. At the present time, out of 2,400 meters all told, we have one-third prepayment meters, and the tendency is to change very rapidly. Whether, as we change, we are going to accumulate a lot of ordinary meters, I don't know; I hope not, but a good many people are changing. They find them a very great convenience. Certainly I can agree with Mr. McGregor that the collecting, making the necessary records and the labor of taking care of them, are no greater, I believe not as great, as with the ordinary meter.

The President—Mr. Woodward, we would like to hear from you on this subject.

Mr. Woodward—The Secretary wrote to me in reference to the matter of prepayment meters, knowing I was particularly interested. Two years ago I made some remarks about prepayment meters here and I have always been an advocate of them. I did not suppose the question of the accuracy of the meter, as to its mechanical construction, would be brought up, because from our experience it does not seem to be open to discussion. As far as our experience goes, we have had no trouble with them at all. We might, out of 300 meters, in the last four years have had 8 or 10 broken open, but have had in no case any trouble with the recording apparatus or with its working satisfactorily. The suggestion that the Secretary gave me was this: To show, if possible, whether or not the prepayment meter increased consumption per meter. I worked over our books carefully and determined very readily that it had increased the consumption. But you must bear in mind that in the past four years we have reduced the price of gas three different times, and so I cannot give an entirely fair comparison. Four years ago we estimated that a prepayment meter ought to bring us an annual consumption of 10,000 feet; to-day our prepayment meters are bringing us an average yearly consumption of 13,100 feet, and regular meters that supply the same class of consumers are bringing us a consumption of 16,800 feet. We don't really push the prepayment meter at all. We never have pushed it, chiefly because the prepayment meter costs a good deal more than the other meter to put in. Our business is partly among a class of customers who are largely transient, and we have to ask deposits from tenants, and so, if a person objects to paying a deposit, we sometimes put a prepayment meter in to obtain a consumer. We are certainly reaching a class of people with the prepayment meter that we would get in no other way. That has been spoken of to-day, and I cannot say more than to emphasize it. We, in our place outside

of New York, have a great deal of construction work going on by the city and contractors, and there is a settlement that is full of the worst class that come to this country. They work for small pay and are very prudent. We have induced those people to put in gas with the prepayment meter. They don't care so much for the light, but they are using gas stoves with the prepayment meter. They bring us a nice return, and we have no trouble with their meters. We could not trust these people for a month's gas bill, neither would they pay a deposit. After the thing is once started and they see their neighbors using the prepayments they become interested. I never could see where there was any additional cost, outside of the meter itself, in the installation of the prepayment meter. It costs no more for our office force to handle prepayment meters, and I hardly believe it costs as much. The same men that read the indices of other meters read the indices and bring in the money for the prepayment meters. The tally slips are handed in to the cashier, with the money, and entered on the gas consumer's ledger, and that is all there is to it. It is a simpler way of collecting than sending out a bill; it saves postage and the consumer does not have to come to the office to pay the money. We think it simplifies the business of our Company. Another thing not to be spoken of lightly is there is absolutely no complaint from the consumer when he has a prepayment meter. The matter is entirely in his own hands. He cannot say, "My bill is too big; I cannot understand it and want my meter tested." We do not hear from him in complaint. If he has a prepayment meter he keeps right on using gas and very seldom stops, because the matter is in his own hands and directly under his control. Just one more thought. While our average shows 13,100 cubic feet per year on prepayment meters, yet we have been able to hold some large consumers where the payment of a monthly bill was almost impossible. Large saloons and like places, that were always bad pay, we now have on prepayments. I have in mind one consumer that we sold last year through a prepayment meter 120,400 feet, or, at our rate of $1.25, he paid us $150.50. This case alone ought to show what these meters can accomplish in the direction of helping swell one's collections.

The Secretary—It seems to me one phase of this prepayment meter question has never been touched upon. I suppose all of us believe that the average person shows less intelligence in his consumption of gas than in his use of any other domestic commodity. It seems to me that the prepayment meter as an educator in the use of gas would be of great value to increasing mutually pleasant relations between the gas supplier and the consumer, and it is no doubt probable that in the majority of cases intelligent use of the gas would result in a decreased gas bill. In my mind the explanation of the two cases stated, where the bills were smaller with the prepayment than with the ordinary meter, is that the consumer gives more attention to his gas and does not waste it, whereas he otherwise did. As an educator of the consumer of gas it seems to me a good thing to have, though in individual cases it may result in a reduced consumption.

The President—I would like to add to what the Secretary said that with the straight meter the consumer did not want to pay his bill after he had burned the gas.

Mr. Gould—My name has been brought up in connection with the McDonald meters. I would say, in justice to Mr. McDonald, that the reason those meters were side-tracked some three or four years ago was that they were set in the basements of apartment houses and the cash boxes got very much demoralized by being broken open by thieves. I don't know that it is anything against the meters. We now set prepayment meters only in rooms under sole control of the consumer.

The President—The discussion seemingly being closed, I will again go contrary to the regular order, and read this question from the Question Box:

"*Method of handling money and accounts of prepayment meters.*"

This is suggested by a gentleman from Connecticut. Who will give us some information on that?

Mr. Woodward—The question does not seem quite clear. Does it mean how the matter is handled? It seems to me it is such a simple thing it cannot admit of very much discussion. We have our regular men who read the indices of all the meters and collect the money. They have their routes and each has a key. They fill out a sheet giving the folio number, the name of the customer, the index reading of the meter and the amount of money. These are handed in to the cashier, and the record of the meter index with the amount of money is entered directly from these cards on to the consumers' ledger. I have seen discussed in another convention something about the gas company selling checks to put in the meter in place of quarters. With us our impecunious customers sometimes substitute "beer checks," good for one schooner of beer, for the silver quarter. These must be made good to us or we discontinue supplying such a customer with gas.

Mr. McGregor—We have a card representing the 12 months of the year. The name of the street and the number of the meter are printed on top. We have one regular man at present who takes the indices and also makes the money collections. He puts in the state, subtracts the amount, and fills in the cash amount that he receives with each meter. Sometimes it is over. It does not always agree, of course, because sometimes a man may put in a quarter and that represents future burning. He returns those to the office; our regular meter men are supposed to take about 250 indices a day, that is, in the regular monthly collections. He averages 165, and his district is very much more scattered than that of the man who of course takes the 250 regular statements. The card is handed in to the receiver or bookkeeper, whoever he may be, who carries out the amount of the cash and compares it with the cards at his convenience. Then it is carried directly from the card to the consumers' ledger. That finishes the whole thing. It is very simple and a very convenient way of getting at it. The cards are divided into streets and into districts, so that it is very easy for the man to go direct when we give him a bunch of districts to collect.

The President—Perhaps some other member has a different method. So far as the Boston Gas Light Company is concerned, if I remember correctly, one collector has charge of all prepayment meters, who makes all the collections. He goes to the box, takes out the money, takes the state of the meter, enters it in the statement book he carries, turns in the statement to the bookkeeper and the money to the cashier. If the statement of the meter and the amount of money indicate that the Company is falling behind, or that the consumer is falling behind, we remove the meter and put another one in its place, so that a few hundred feet one way or the other will tell very quickly. The principle is the same as Mr. McGregor described.

On motion of Mr. McGregor, seconded by Mr. Woodward, a vote of thanks was passed to Mr. Goulding. The President in announcing the vote said: Mr. Goulding, we thank you for your paper, and you can see from the amount of discussion that it was certainly of a great deal of interest to the Association.

On motion the Association adjourned, to reassemble the following morning at 10 o'clock.

[To be Continued.]

[Synopsis of Proceedings.]

SEVENTH ANNUAL MEETING, MICHIGAN GAS ASSOCIATION.

HELD IN DETROIT, MICH., FEB. 21 AND 22, 1900.

FIRST DAY, FEB. 21.—MORNING SESSION.

The meeting was called to order by the President, Mr. L. E. Walker, at 10:30 A.M. The following responded to the

ROLL CALL,

Beatley, H. G.	Fox, A. G.	Lynn, J. T.
Bostwick, W. J.	Frazer, D. H.	Morgans, W. H.
Brown, E. C.	Gallagher, E. F.	Osius, G.
Calhoun, R.	Gale, A. S.	Persons, F. R.
Church, L.	Guitteau, F. B.	Raynor, C. H.
Collins, W. H.	Guldlin, O. N.	Roper, G. D.
Cressler, A. D.	Harris, G. E.	Sterling, J. C.
Cunningham, J. R.	Harper, H. D.	Tippy, B. O.
Dean, S.	Hoagland, E. H.	Van Wie, E. G.
Dole, S. M.	Howden, F. J.	Walbridge, H. D.
Doty, P.	Henderson, E. H.	Walker, L. E.
Douglas, H. W.	Hyde, H. H.	Weston, J. A.
Eaton, W. M.	Hellen, J.	Wilson, J. C.
Eaton, A. B.	Lloyd, E. F.	

REPORT OF THE EXECUTIVE COMMITTEE.

The report of the Executive Committee was as follows: Gentlemen of the Michigan Gas Association: Your Committee have to recommend to membership in this Association the following gentlemen:

Active.

Cranston, W. E., Supt. Mt. Clemens (Mich.) Gas Co.; Cobb, B. C., Gen. Supt. Detroit City Gas Co.; Challiss, Paul, Engr. Adrian (Mich.) Gas Co.; Foote, W. A., Sec. Albion (Mich.) Gas and Coke Co.; Hartman, W. E., Supt. Kalamazoo (Mich.) Gas Co.; Hellen, F., Supt. Distributing Dept., Detroit City Gas Co.; Jones, T. J., Asst. Sec. Lansing (Mich.) Gas Light Co.; J. G. Light, Supt. Hillsdale (Mich.) City Gas Co.; Sloan, J. C., Supt. Port Huron (Mich.) Gas Co.; West, W. D., Supt. Windsor (Can.) Gas Co.

Associate.

Guenther, C. M., Mgr. Harris Bros. Co.; Knowlson, A. T., Gas Appliance Exchange; Lawrence, F. R., Salesman Detroit Stove Works, Detroit; Martin, Geo. H., Salesman Dangler Stove and Mfg. Co.; Whirl, Jno. J., Salesman Ideal Mfg. Co.

The following resignations have been handed to the Secretary: From active membership, Chas. R. Wells, Bay City; C. M. Begole, Flint. From associate membership, W. P. Bonney, R. H. P. Lowry and W. A. Luce, Erie, Pa.

For Nominating Committee the following are recommended: W. H. Morgans, J. T. Lynn and E. F. Gallagher.

The papers to be read at this meeting are as follows: "Meter Testing," by Paul Doty; "Differential versus Uniform Prices for Gas," by Sedgwick Dean; "Ammonia: Its Saving and Concentration," by George Osius; "Business End of a Small Gas Works," by S. Milo Dole.

Respectfully submitted, L. E. Walker, C. H. Raynor, } Ex. Com.

The report was on motion adopted.

Report of Secretary and Treasurer.

The report of the Secretary and Treasurer (Mr. H. H. Hyde), which related to the period between Feb. 1, 1899, and Feb. 20, 1900, showed the membership to be 100; honorary, 2; active, 57; associate, 41. As Treasurer, Mr. Hyde reported receipts of $150, an expenditure of $106.01, and total cash on hand of $189.43.

On motion, the reports were adopted.

A Fraternal Telegram.

The Secretary read the following telegram, dated Boston, Mass., Feb. 21:

"The New England Association of Gas Engineers assembled in convention extends its congratulations and best wishes to the Michigan Gas Association.—N. W. Gifford, Secy."

It was ordered that Secretary Hyde be instructed to send a suitable message in reply to the above.

President Walker then read the following

INAUGURAL ADDRESS.

Gentlemen of the Michigan Gas Association:

Another year, with its ups and downs, its pleasures and pains, its lights and its shadows, has registered on that meter whose inspector is old Father Time. To some of us in the gas fraternity it has indeed been an eventful one, and many changes have taken place which a year ago were yet undreamed of. The gas business in general, together with every other legitimate industry, has enjoyed a year of almost unparalleled prosperity. Companies with which I have had communication have nearly all been able to report a healthy growth. Naturally some branches of the business are enjoying a much more rapid advancement than others. I refer in particular to the continued rapid increase of the use of gas for fuel as against the almost stationary use of same for power—of course in the latter case there are some notable exceptions; but I think I can safely say I voice the sentiments of the majority in stating that the use of our product in the way of gas engines and similar devices has, to say the least, been disappointing. And while we desire to view the situation from an optimistic standpoint, we shall have to regretfully concede that in this line gasoline still "has the pole."

As I have just remarked, there are some notable exceptions to this, and sincerely hope ere long the exception will become the rule, and that gas shall occupy its rightful place—*i. e.*, at the head of power producing agents.

It would be presumptuous in me to attempt to further enlighten the well informed body whom I have the honor of addressing in anything particularly new in the occupation with which we are all so justly proud of being identified. Neither is it within the scope of an address of this kind to touch specifically on new apparatus for producing and consuming our product. Our Gas Journals bring to our notice each week the topics bearing on improvements and new ideas in general, as well as current happenings to the members individually and collectively of our fraternity.

The question of incandescent gas lamps has been pretty thoroughly threshed over, and we, one and all, recognize their advantage, and sincerely welcome any further improvement which will lessen their fragility. The prepayment meter has also come in for its share of notice. A long step toward the ideal purification of gas has been made; and the year has been marked by many improvements in all branches of our profession.

An as yet unsolved problem, with those of us interested in comparatively small works manufacturing coal gas, is the disposal of that important by-product, tar. Indeed any sale at a fair figure of the same, which but a few years since commanded a good price, is now no easy task. A more efficient method than those in general use for consuming it under our benches and boilers would be heartily welcomed, and we hope an increasing demand for the higher chemical constituents may tend to stimulate the market for this remarkable residual. Our gas stove manufacturers have certainly kept abreast of the times in the way of improvements, and the patterns for this year seem to have nearly reached perfection.

The seemingly ruinous and uncalled-for gas wars which have been waged between supposedly rival companies in some of the larger cities of our country, interest those of us who are not directly affected, only so far as we deplore the effect such schemes have of tending to demoralize the legitimate prices we should receive for our product, by leading the somewhat unthinking public to believe that if gas is ever sold at a price that is lower than the actual cost of manufacturing it, companies throughout the land should be able to do so, never taking into consideration the motive which actuated those in power to make these spasmodic low rates. The municipal ownership bugbear is still abroad in the land; but its menacing head seems at present to be reared more at our brethren in the electric light and motive business than at us. Naphthaline, like poverty, we have always with us.

Electrolysis is another of our foes with which we have more often to contend. This problem was interestingly discussed in recent issues of the leading Gas Journals. The furore which attended the exploiting of acetylene gas seems to have reached its zenith, and under present conditions can scarcely longer be considered a dangerous rival.

Various types of lamps with incandescent mantles using other than our product form rather lively competitors in some sections of our country, but can scarcely seriously compete with our commodity.

The extraordinary advance in the price of metals, while doubtless having a tendency to limit construction work, cannot check the onward march of progress. In fact, a stiffer price in such commodities usually indicates more money in the hands of the people to spend in such conveniences as gas stoves.

We all recognize and have frequently discussed the changed attitude the gas company has to assume toward it patrons as compared with a few years ago. The old gas man's adage that "The money was made in the retort house" is now only partially true, as few lines of business are so dependent on each of its employees from highest to lowest for its advancement and success.

The papers to be read at this meeting are all of the practical kind and cannot fail to prove instructive to one and all. I sincerely trust a free discussion of them may be indulged in, as the real benefits of a meeting of this nature are derived from an unfettered exchange of ideas.

To still further the strength and usefulness of our Association, I would suggest that a committee of five or more be selected to systematically endeavor to welcome into our fold any and all who are eligible to belong. I would also like to see a further attempt to solve the tar problem, and an endeavor made to devise a more satisfactory market for the output among the smaller works where the local demand is inadequate to meet the supply.

It is with feelings of profound congratulation that we can say, as far as known, our numbers are unthinned by death.

The Beautiful City of the Straits, where we have had the good fortune to assemble, is certainly a town of which the genial gentlemen who are interested in the manufacture of gas, and those whose ability is devoted to new and better methods of utilizing it, may well be proud; and we thank them one and all for the cordiality shown to us.

The address was referred to a committee of three (Messrs. H. W. Douglas, B. O. Tippy and R. Calhoun) for consideration and report.

Mr. Sedgwick Dean then read the following paper, entitled

DIFFERENTIAL VERSUS UNIFORM PRICES FOR GAS.

In reviewing the claims for the adoption of the systems under consideration I assume that the best business policy is the one which, by its freedom from claptrap, not only disarms public criticism but also draws to its support all fair-minded people, and that temporary success will not warrant the adoption of a different one.

The advocates of differential prices offer the following reasons for their adoption:

A. They increase day consumption of gas, which furnishes employment for the works at a time when they would otherwise be idle, and, therefore, be a charge upon the business as a whole.

B. They meet a popular demand, and tend to establish pleasant and profitable relations with the public at large.

C. The introduction of gas at a low price for a specific purpose materially aids in obtaining new consumption; that is, it is much easier to induce residents on existing mains to pipe their buildings.

D. That the service pipe and meter once in the building the way is cleared of many obstacles, and as a result, an increase of business is obtained at a higher price than the introductory rate.

E. They enable managers to hold a large volume of business by making concessions for quantity used, or on account of extreme competition and for personal influence or assistance.

F. They abolish the inflexible, iron-bound rule of "One price, which says take it at this price or you cannot take it all," which, as a business method, antagonizes a part of the community and leads to the cry of monopoly.

Let us analyze these claims in the order I have stated them:

A. An increased consumption of gas is unquestionably desirable, be the same either during the day or night; which is most so, depends upon the output of different works. If the day consumption exceeds 50 per cent. of the total output, then an increase of night consumption would be most profitable, provided the price of gas sold during the two periods of the day is the same.

The reports to be found in "Brown's Directory" show that there are many gas companies who sell more than half the gas they manufacture for fuel, which may fairly be classed as day consumption. The extraordinary efforts being made by managers to sell gas ranges will doubtless soon carry the day consumption of a majority of the gas companies beyond that of the night.

Mr. Harry W. Douglas, in his paper[1] entitled, "The Use of Gas for Purposes Other than Fuel," read at the last meeting of this Association, stated this tendency thus: "Let us consider how our illuminating business has fared in the past 10 years. Taking an average increase of 10 per cent. per annum in our total business, and assuming 100 as a basis, the total business of the present would be 227. Again, assume that this year 50 per cent. of our business is fuel, which, I think, is a fair supposition, it makes the lighting sales of to day 113, or a gain of 13 per cent. in 10 years."

In view of these statements is it not safe to say that the day consumption has been and is, at the present time, being stimulated at the expense of the night consumption? Twenty-five years ago reason *A* may have had some footing to stand upon, but at this date, when day consumption has reached a volume of 50 per cent., it has, through this change of conditions, lost its force, and, therefore, must be numbered with the things of the past.

B. The popular demand as stated in *B*, to my mind, when written out in plain words, is this—certain classes of people in every community, either from mental formation or lack of fair reasoning faculties, demand special concessions to themselves. Honorable business methods must yield to their demands, otherwise the business is unpopular with them. They are a minority, and the favoritism, which gains their approval, is the seed of socialism, the promoter of municipal ownership, which seeks through the ballot box and the assessor's office to make the accumulations of the thrifty the source from which to draw capital for communistic enterprises.

C and D in the main cover common points. It is beyond question that low prices stimulate the introduction of gas; the history of opposition gas companies and gas wars amply demonstrate this. However, the object of most business enterprises is not introductory; of what value is a consumer who yields no net income? He certainly counts one on the consumption ledger, and may be of service there, but on the balance sheet of the year he steps down and out. Again, who can say that when gas is sold for $1 per 1,000 for fuel and $1.40 for light, that what is gain by gas sold for fuel is not more than lost by that sold for light, and that had the price for both purposes been $1.20 per 1,000, that the net income of the company would not have been greater than it was with the two prices mentioned. Is it a fair business method to induce a customer to take your wares for one purpose at or near cost, and then expect or compel him to use the same article for another purpose at a much higher price? Does not such a practice involve the principle of the leader in trade? That is, sell some one thing without profit, and recoup the loss on other articles by selling them for more than a legitimate profit. Business experience demonstrates that the leader practice ultimately leads to bankruptcy. Who can say what the same practice under another name may do for the gas business?

E. Influence or personal assistance cannot be honestly bought by indirect methods, for the reason such methods partake of partiality towards an individual or a class. The expense of such partiality must be borne by the balance of the community. Had the service rendered been paid for, the same as any other service rendered the company, the party receiving the payment would bear his proportion of his own bill. Meeting competition by secret bargains simply places the management in a position to be bled by intriguing customers, and in a majority of cases increases instead of diminishing competition, and results finally in the loss of the very business sought to be held; besides the person whom the management has endeavored to placate and hold as a customer is now in position to create the impression that it is only necessary to have a pull with the management and you will receive a corresponding benefit in the prices of gas consumed. Concessions in price for quantity used being sanctioned by common practice in all branches of the world's business are admissible and justifiable in the sale of gas; but these concessions cannot fairly be doled out by the manager. The consumers of the company should be divided into classes, and at the end of the year each consumer should be paid a quantity rebate, as laid down in the printed rules of the company. Under this plan all are used alike and there can be no just cause for complaint.

F. If a price is just, it should in justice apply alike to all. The moment yon deviate from it, you do wrong, for those to whom you have applied the rule are at a disadvantage with those for whom you have made the exception. It may be diplomatic to avoid antagonizing people with whom you are thrown in business contact; but diplomacy which grants to one what it refuses to another in business is nothing more than polite favoritism. The claim for a uniform price of gas may be summarized as follows:

1. *As to consumer.*—It lessens the cost of piping by avoiding the duplication of pipes. There are thousands of houses to-day where gas on the range costs $1 per 1,000; if used with a Bunsen burner in a bath or bed room, it is $1.25 to $1.50 per 1,000, the price in this case depending where it is used and not for what it is used.

2. *As to the gas companies.*—It saves duplication of meters. It reduces the labor of taking meters and collecting bills. It simplifies the keeping of accounts, and in these three items greatly reduces the cost of distribution. There is without doubt at this date more money unnecessarily invested in meters and their connections than the total cost of all the meters in use in America 25 years ago. The meter makers should surely for a space of much more than three hours cry with one voice, "Great is the differential price of gas, it hath builded our business."

3. The price of gas should be based upon its cost of production and distribution, and not upon the purpose for which it is used. The discussion of this proposition seemingly is as unnecessary as it is to argue that four times one equals twice two; but being so self-evident why is it that 90 per cent. of the gas companies of the United States have, for the same gas, coming through the same pipes manufactured at the same works and at the same cost, two prices—one when it lights the room and a second and lower price when it warms it. By what course of reasoning was this practice established? What species of witchcraft continues it? The practice has no parallel in any other business. How many members of this Association will hesitate to denounce and ridicule their grocer provided he promulgated the same rule for sugar; no matter if he used duplicate scales, how would it sound—sugar for coffee five cents per pound, the same sugar from same barrel for cake six cents per pound. Still year after year a practice equally as ridiculous and unjustifiable continues in the sale of gas. Can we not see that this practice will in the future return to torment its present advocates? Does it not build a sure foundation for a lower price for gas? Will not the plebian mind, which is unregenerated by gas, reason somewhat in this way: If gas companies can sell gas for fuel for 80 cents to $1 per 1,000, why can they not sell the same gas at the same price for light?

4. A gas light company is a public facility, and as such the pubic in equity has a right to demand a uniform price for like service rendered. This statement is too palpable to need elucidation or argument. The gas company which furnished one citizen during a month 1,000 feet of gas to light his office and another citizen 1,000 feet of gas to heat water for bathing purposes has rendered both the same service; namely, it has furnished each with 1,000 feet of gas; in fairness they are both entitled to the same price. In the absence of any special provision in the charter, or a personal agreement covering different prices, I venture the statement that there is not a judge in this State of Michigan but who would so charge the jury. Coming back to the sugar illustration, do you think a grocer could collect a bill for 200 pounds of sugar, charged under the same date 100 at $5, and the other at $6? But here is gas for fuel at $1 per 1,000 and for light at $1.20 per 1,000.

5. The statement made that gas companies could not exist and sell their entire output at the fuel price is an avoidance of the question, and amounts to an admission that the system of two or more prices is unjustifiable and therefore wrong. By what rule of equity can you demand of A $1.25 for 1,000 feet of gas that you may sell B 1,000 feet of the same gas for $1.

Finally. If my reasoning is not faulty, we may conclude that differential prices for gas are outside of sound business principles, and therefore should be discontinued; that a uniform price for like service is economical to both the consumer and the gas company, avoids all secret arrangements and understandings between the company and its patrons, maintains equity in its dealings with all the public, and conforms to the business practices of the world.

The long and brisk discussion that followed was terminated by a vote of thanks to the author. An adjournment to terminate at 2 P. M. was ordered.

(To be Continued.)

1. See JOURNAL, March 20, 1899, p. 407.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

"H. S. C." writing from Princeton, Ills., under date of February 27th, says: "Mr. George L. Dunbar, brother of Mr. James W. Dunbar, Secretary of the Western Gas Association, has become Superintendent of the Princeton Gas Light Company, succeding Mr. Frank A. Johnson, who retires on account of ill health. Mr. Johnson sails in April for Europe, where he will spend some months."

THE Laclede Gas Light Company, of St. Louis, is now comfortably located in its new office, 716 Locust street.

MR. W. H. ADDICKS, brother of Mr. Walter R. Addicks, President of the New England Association of Gas Engineers, died in Philadelphia about a fortnight ago. He was largely interested in an administrative capacity with certain large Philadelphia railroad interests.

The proprietors of the Newton and Watertown (Mass.) Gas Light Company so "F. W. M." is informed, recently voted to reduce the selling rate to $1.25 per 1,000 cubic feet, net, the concession to date from April 1st. If we mistake not this is equivalent to a reduction of 10 cents per 1,000.

MR. W. B. MILLER, has been appointed Superintendent of the works of the River Shore Gas Company, Riverton, N. J.

THE total receipts of the San Francisco Gas and Electric Company, for the year ended January 1, 1900, were $2,187,371.76, of which $1,381,263.82 is to be credited to gas account, the balance ($806,107.94) going to the electric end.

THE Mahanoy City (Pa.) Gas and Light, Heat and Power Companies have elected the following Directors: E. Sullivan, H. Ball, H. K. Smith, G. F. Brindle and A. B. Wagner.

RECENT advices from Haverhill, Mass., are to the effect that interest in the local gas rate situation continues unabated, and it is now expected that the decision of the United States Circuit Court will be given early next month. The bill of complaint filed by the Company is a volumous document, comprising 16 typewritten pages, and it contains many specific statements regarding the entire controversy which has arisen since the start was made by Mayor Chase last year for lower rates. The return date of the bill is April 2, and in the bill the Company recites that the present actual cost of production, including the amount allowed for depreciation and a fair return for money invested, is 91 cents per 1,000 cubic feet. The Company also states that the price of $1 per 1,000 feet would never have been made if it had been known that the price of materials would increase as they have increased. The Company also contends that at the present time $1.10 would be a fair price for gas in Haverhill. When interviewed on the 2d inst. at the Massachusetts State House the members of the Board of Gas and Electric Light Commissioners said they had no remarks to make regarding the action of the Haverhill Company in refusing to abide by the order for 80 cent gas. Attorney-General Knowlton will represent the Commission at the hearing. It has been rumored that, notwithstanding the action of the Company, the Commission intends to take steps to enforce the 80 cent order. Nothing will, however, be done until Mr. Knowlton returns, when ex-Mayor Matthews, of Boston, counsel for the Company, and the Attorney-General will hold a conference. Mr. Matthews then expects to reach an agreement under which nothing will be done until the entire matter is settled in the courts. Failing to reach an agreement, it is stated unofficially that the Company will secure a temporary injunction to restrain the Commission from taking any action until after the decision of the United States Circuit Court.

SUPPLEMENTING the above, the following references to the matter, in our latest budget from "Observer," will be of interest, since "Observer" speaks by the book: "As predicted, the Haverhill Gas Light Company decided to contest the legality of the order of the Board of Gas and Electric Light Commissioners requiring it to furnish gas at 80 cents per 1,000, and has retained as counsel Messrs. Story, Thorndike & Palmer and Nathan Matthews, Jr. A petition was filed in the United States Circuit Court on March 1st, to restrain the Commissioners from enforcing their order, and a hearing will be ordered. The bills are being sent out at $1 per 1,000, and a good 25-candle power water gas is being distributed. It is not believed, however, that furnishing good gas and good service, nor proving to the court that gas cannot be made and sold at a profit in Haverhill at 80 cents per 1,000, will suffice to allay the disturbance. The discontent appears to be based upon the belief of both public and Commission that the Haverhill Gas Securities Company intends, in one way or another, ultimately to make the people of Haverhill pay interest on a million dollars, when the actual capital invested and accumulated did not amount to over $400,000. Until some assurance is made to the Haverhill people that the fixed charge due to capital shall be a reasonable one, it is not believed that any satisfactory peace can be assured, and further conflict will only make the matter worse. The mistake of over-capitalization, and extreme reduction by the Commission of the selling price to a point below cost, at existing prices of materials, have wrought havoc among the gas companies of the State, and they are prayerfully asking that no further mistakes be made. Some form of action looking toward lower prices is being taken in practically every large city in the State, and in many of the towns. Most of the hearings will be before the Board of Gas and Electric Light Commissioners, who have already held one on the application for the reduction in the price of gas in Lynn, in which city gas is now selling at $1 per 1,000. New Bedford and Lowell are next on the list, with others to come. The hearing in the Boston case is before the Committee on Manufactures of the Legislature. Several sessions have been held, at the first of which Mr. Whitney, was heard at his own request, on "What is a fair price of gas for Boston?" A great many figures were presented of the various companies of the Boston field, which certainly showed a queer state of affairs as to costs and sales amongst the companies, if the testimony was accurate. The inference to be drawn was that it was his opinion that gas should be sold at $1 per 1,000 in Boston, and that the companies would have a hard time, at present prices of materials, to secure their regular dividend. The subsequent hearings developed little of general interest.——Some 80 odd bills are before the Massachusetts Legislature, affecting directly or indirectly the affairs of gas and electric companies.——About half the gas now used in Boston is being supplied from the Everett coke ovens.——The annual meeting of the Guild of Gas Managers was held last week. An occasional invitation and visit enable us to say that for good comradeship and sound commonsense the Guild takes every prize.——The Hon. John M. Hill, of Concord, N. H., died March 4th. He was Treasurer of the Concord Gas Light Company for many years, and was held in high esteem amongst the gas men of New England. Of late years he has taken no active part in gas matters, although keeping in touch with them.——The Newton and Watertown (Mass.) Gas and Electric Company has reduced the price of gas from $1.35 to $1.25 per 1,000 cubic feet.——The Newburyport (Mass.) Gas and Electric Company has reduced the price of gas to $1.50 per 1,000 cubic feet, the concession to go into effect April 1st. The Company states that during its existence of 50 years its average dividend has only been 6 per cent. The Company has been doing a small business, but it is now growing rapidly, and extensive enlargements are under consideration.——Five dollars a ton for gas coal and 6 cents a gallon for gas oil are making many a New England gas man lose his sleep.

THE franchise of the Monmouth (Ills.) Gas Company has been renewed for a period of 20 years. Under the new agreement the Company may not charge ordinary consumers in excess of $1.50 per 1,000 cubic feet, and gas used for public account is to be billed at $1.25 per 1,000.

THE Oakland (Cal.) *Enquirer*, of recent date, says that because Chief Ball and the crew of the 15th street fire engine company did such valiant service in extinguishing the fire in the building of the Oakland Gas Light and Heat Company, at 13th and Clay streets, the night of February 5th, the Directors of the Company voted the property savers a gift of $100.

A GAS company for Waynesburg, Pa., is proposed. This place is the capital of Greene County, Pa., and is in Marion township, on Ten Mile Creek, at a point 45 miles south by west of Pittsburg. Its population does not exceed 4,000. The capital of the proposed concern is put at $50,000.

A BILL is before the New York Legislature under which it is declared that a "corporation, association, company, co partnership or persons shall not charge or receive for illuminating gas in the city of Poughkeepsie a sum to exceed $1.25 per 1,000 cubic feet." This is a strike, pure and simple. Its sponsor is William A. Tripp, a resident of Rhinecliff, N.Y., who represents in the Assembly the second Dutchess County district, in which county Poughkeepsie is located.

THE plant and franchises of the Titusville (Pa.) Gas Company were sold at public auction some days ago. The purchasers were Mr. E. T. Roberts, of Titusville, and Mr. J. F. Miner, of New Brighton, Pa., who are understood to be the controlling bondholders. The price paid is said to have been $8,000.

A CORRESPONDENT at Minneapolis, Minn., writing under date of the 1st inst., says: "The appointment of Mr. C. S. Benson as Receiver for the St. Cloud Gas and Electric Company was somewhat of a surprise, for it was not generally known that the concern was in financial straits, although among the well-informed it was known that the Company had defaulted on the interest due on its mortgage bonds January 1st. On the water works there are $130,000 bonds, and $75,000 on the gas and electric property. The St. Cloud Water, Light and

Power Company, which assumed this indebtedness, is bonded for $100,000 more. The default in interest was only on the bonds of the Gas and Electric Company, and the holders of those bonds, mostly Eastern parties, now seek to foreclose." Mr. Benson is the President of the Water, Light and Power Company, of St. Cloud.

THERE is before the authorities of Dayton, Ohio, a proposition to order a reduction in the selling rate charged by the Dayton Gas Light and Coke Company. To an outsider it would seem that the Company's rates are very fair ones—gross, $1.10 per 1,000; net, $1.

THE authorities of Winnipeg, Manitoba, propose to submit a by-law for the consideration of the voters, in a ballot to be taken some time next May, on the proposition to raise the sum of $300,000 "For the acquisition or construction of plant for the supply of gas for general commercial and domestic use, and for the furnishing of facilities for the supply of electric lighting and power, all to be under civic management."

A CORRESPONDENT, writing under date of March 2d, says that a concern bearing the title of the Terre Haute Pipe Line Service Company, had filed articles of incorporation with the County Recorder, and had applied for a franchise to the authorities of Terre Haute, Ind. Prefacing his account with the remark that the whole thing has a fishy look, he goes on to say: "The object of the association, as stated in the article, is 'to acquire, construct, own and operate works for the manufacture and production of various fluids and the distribution of the same by pipe lines for refrigeration, preservation and fire protection, and to furnish the same to public and private consumers, and the manufacture and distribution by pipe lines of heating and illuminating gases, and to furnish the same to public and private consumers, and the production of the bye-products connected with the operation of said works, and the sale of all products.' The officers of the concern are: Directors, W. P. Ijams, G. A. Conyman, C. H. Goldsmith, H. G. Miller, F. B. Smith and S. R. Hamill, of Terre Haute, and George E. West, of Chicago; President, W. P. Ijams; Vice President, H. G. Miller; Secretary and Treasurer, G. A. Conyman. The Company asks for a franchise for 30 years, and agrees to deposit a satisfactory bond for $10,000, within 20 days after the franchise is granted, for the faithful performance of the contract. The maximum price of gas is not to exceed 75 cents per 1,000 cubic feet, with a discount of 10 per cent. for prompt payment—within 10 days. The Company agrees to erect a plant to cost not less than $100,000, within two years from the date of the franchise. It is also stipulated that it shall not enter into combination with any persons or corporation to regulate the price of gas."

IT does not seem possible that the authorities of Terre Haute will consent to this grab, especially when it is remembered that the Citizens' Gas and Fuel Company of that city is supplying an excellent quality of gas, at the rate of $1 per 1,000 on illuminating account—with discounts ranging from 10 to 25 per cent. for prompt payment, according to quantity used—and on fuel account 75 cents per 1,000. Further, Terre Haute has had quite a lengthy experience in respect of opposition companies.

THE Committees on Light, Finance and General Laws are considering proposals for the betterment of the Alexandria, (Va.) municipal gas works, and the selection of a superintendent. The source from whence this information is obtained, adds: "When the gas works were established a superintendent was appointed, but afterward the superintendency was abolished, the salary of the Clerk of Gas was increased, and a subordinate superintendent was put in charge. It is now proposed to renew the former plan." Which renewal, it seems to us cannot be made too soon.

AT the annual meeting of the Providence (R. I.) Gas Company the following officers were chosen: Directors, William Goddard, A. B. Slater, R. C. Taft, G. W. R. Matteson, N. D. Arnold, J. E. Studley, Henry Pearce, Jno. W. Ellis and Isaac C. Bates—the two last named succeed to the vacancies caused by the deaths of Mr. Lucian Sharpe and Mr. Jesse Metcalf; President, R. C. Taft; Vice-President, Wm. Goddard; Treasurer and Secretary, A. B. Slater.

Mr. GODFREY L. CABOT, writing from Boston, under date of the 6th inst., says: To the Editors AMERICAN GAS LIGHT JOURNAL: I am much interested in the article on "Pumping Gas Five Miles at 20 Pounds Pressure," in your issue of March 5th. I beg to confirm the statement of the writer that this is a perfectly safe procedure, involving no new elements of danger. In my judgment there is much less danger to the public health and welfare in piping artificial gas at 20 lbs. pressure, in wrought iron pipe with screw couplings, than in the usual practice of conducting gas at low pressures in cast iron pipe with lead joints. Gas is pumped over 100 miles at various points in Indiana to Chicago, at pressures which are said to reach 700 lbs. The rock pressure in Indiana is now about 120 lbs., and the difference is the artificial increment caused by the pumps. The lines used for this purpose are made of 10 inch pipe, screw couplings, which are set up by a portable machine. My own lines carry at considerable pressure a much larger amount of gas than is produced by any Company in this city, and with a leakage so small that it would be hopeless to measure it. It is needless to say that they are all made of screw pipe, iron or steel. In the natural gas business the usual practice is to reduce the pressure at the outskirts of any large town; but this is not necessary if special precautions are taken to so lay the pipe that if it should begin to leak the leakage will immediately reach the surface of the ground, without entering any building. Gasholders are beginning to be used for natural gas in order to increase the available production of the wells, and this use will unquestionably rapidly increase.

The Market for Gas Securities.

The city gas share market is not in a condition seemingly to guarantee purchase for investment account, quotations for the week being on the low side. The meeting of the Consolidated Gas Company to-day (Friday) for the purpose of issuing something over fifteen millions, at par, of its new stock for the taking over, in the rough, of thirty-six millions of various electric stocks, was brought off satisfactorily, in the opinion of the gentlemen in control of the situation. Mr. W. C. Whitney declared that if the electricians had the thing to do over again, in respect of changing their shares for shares in the Consolidated Gas Company, they would exact better terms. Mr. Whitney and his friends "manfully stood to their bargain." The vote on the new issue was practically unanimous, although one small official protest was made. Consolidated closed at 176 to 177. Despite the manipulation that is going on, it looks to us that city gas shares are good things to buy. Next month will tell the story.

The general situation is unchanged. Brooklyn Union is very cheap, and so is Peoples, of Chicago, despite the rumors of the fierce war that the Ogden Company is about to commence over a division of the Chicago gas trade. There is nothing much of interest to say in connection with the general market.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

MAR. 12.

☞ All communications will receive particular attention ☜ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$39,078,000	100	176	177
Central Union, Bonds, 5's.	3,000,000	1,000	103½	105
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	115	118
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	275	300
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	.	..	.
New Amsterdam Gas Co.	13,000,000	100	26	26⅛
Preferred	10,000,000	100	44	46
Bonds, 5's	11,000,000	1,000	95¾	96¼
Northern Union, Bonds, 5's.	1,250,000	1,000	95	97
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	109	111
" 1st Con. 5's	1,500,000	..	115	..
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	105	117
Preferred	5,000,000	100	138	145
Bonds, 1st Mortgage, 5's	1,500,000	1,000	110	114
Yonkers	299,65	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	144	144¼
" " Bonds (5's)	15 000,000	1,000	118	119
Bay State	50,000,000	50	1⅝	1¾
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	40	..
" 1st Mtg. 5's	475,000	1,000	96½	99½
Boston United Gas Co.—				
1s Series S. F. Trust	7,000,000	1,000	92	..
2d " " "	3,000,000	1,000	68	..
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	69	71
Central, San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,207,000	1,000		108
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	60	65
Preferred	3,026,500	100	84	86
Consumers, Jersey City Bonds	600,000	1,000	102	105
Cincinnati G. & C. Co.	8,500,000	100	193½	194½
Consumers, Toronto	1,700,000	50	230	235
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000		
Consolidated, Baltimore	11,000,000	100	54	55
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	21	23
" Con. Mtg. 5's	380,000	1,000	87	90

Advertisers' Index.

GAS ENGINEERS.

	Page
Wm. Henry White, New York City	435
Fred. Bredel, Milwaukee, Wis.	422
Geo. R. Rowland, New York City	433
The Western Gas Construction Co., Fort Wayne, Ind.	440
Humphreys & Glasgow, New York City	433
American Gas Co., Phila., Pa.	422
David Leavitt Hough, New York City	432
Economical Gas Apparatus Construct'n Co., Toronto, Ont.	419
Baxter & Young, Detroit, Mich.	432
United Gas Improvement Co., Phila., Pa	427
James T. Lynn, Detroit, Mich.	432
A. E. Boardman, Brevard, N. C.	432

GAS WORKS APPARATUS AND CONSTRUCTION.

	Page
James R. Floyd's Sons, New York City	436
Continental Iron Works, Brooklyn, N. Y.	434
Deily & Fowler, Phila., Pa.	436
Kerr Murray Mfg. Co., Fort Wayne, Ind	432
Stacey Mfg. Co., Cincinnati, Ohio	435
Bartlett, Hayward & Co., Baltimore, Md.	433
Davis and Farnum Mfg. Co., Waltham, Mass.	432
R. D. Wood & Co., Phila., Pa.	434
Isbell-Porter Company, New York City	434
Fred. Bredel, Milwaukee, Wis.	422
United Gas Improvement Co., Phila., Pa.	427
National Gas and Water Co., Chicago, Ills.	429
Economical Gas Apparatus Construct'n Co., Toronto, Ont.	419
The Western Gas Construction Co., Fort Wayne, Ind.	440
Humphreys & Glasgow, New York City	433
American Gas Co., Phila., Pa.	422
Logan Iron Works, Brooklyn, N. Y.	436
Riter-Conley Mfg. Co., Pittsburgh, Pa.	435
Baxter & Young, Detroit, Mich.	432
Berlin Iron Bridge Co., East Berlin, Conn.	421
G. Shepard Page's Sons, New York City	432
James T. Lynn, Detroit, Mich.	432
A. E. Boardman, Brevard, N. C.	432
Sutherland Construction & Improvement Co., N.Y. City	420
Chris. Cunningham & Son, Brooklyn, N.Y.	418

PROCESSES.

	Page
Bartlett, Hayward & Co., Baltimore, Md.	433
United Gas Improvement Co., Phila., Pa.	427
Burdett Loomis, Hartford, Conn.	434
National Gas and Water Co., Chicago, Ills.	429
Economical Gas Apparatus Construct'n Co., Toronto, Ont.	419
The Western Gas Construction Co., Fort Wayne, Ind.	440
Humphreys & Glasgow, New York City	433
Sutherland Construction & Improvement Co., N.Y. City	420
B. E. Chollar, St. Louis, Mo.	420

SCRUBBERS AND CONDENSERS.

R. D. Wood & Co., Phila., Pa..... 434
James R. Floyd's Sons, New York City..... 436
Continental Iron Works, Brooklyn, N. Y..... 434
Logan Iron Works, Brooklyn, N. Y..... 436
Riter-Conley Mfg. Co., Pittsburgh, Pa..... 435

TAR AND CARBONIC ACID EXTRACTOR.

R. D. Wood & Co., Phila., Pa..... 434

AMMONIA CONCENTRATORS.

Michigan Ammonia Works, Detroit, Mich..... 417
American Gas Company, Phila., Pa..... 422

GAS METERS.

John J. Griffin & Co., Phila., Pa..... 400
American Meter Co., New York and Philadelphia..... 439
Helme & McIlhenny, Phila., Pa..... 439
D. McDonald & Co., Albany, N.Y..... 437
Nathaniel Tufts Meter Co., Boston, Mass..... 438
Maryland Meter and Mfg. Co., Baltimore, Md..... 438
Metric Metal Co., Erie, Pa..... 439
Keystone Meter Co., Royersford, Pa..... 438
Detroit Meter Company, Detroit, Mich..... 439

PREPAYMENT METERS.

American Meter Co.. New York and Philadelphia..... 439
John J. Griffin & Co., Phila., Pa..... 400
D. McDonald & Co., Albany, N. Y..... 437
Helme & McIlhenny, Phila., Pa..... 439
Nathaniel Tufts Meter Co., Boston, Mass..... 438

GAS AND WATER PIPES.

M. J. Drummond & Co., New York City..... 437
R. D. Wood & Co., Phila., Pa..... 434
Warren Foundry and Machine Co., New York City..... 437
Donaldson Iron Co., Emaus, Pa..... 437
Chris. Cunningham & Son, Brooklyn, N.Y..... 418
Cornell & Underhill, New York City..... 416

PIPE CUTTERS.

The Anderson Pipe Cutter Co., East Boston, Mass..... 417

GAS MAIN STOPPERS.

Safety Gas Main Stopper Co., N. Y. City..... 419

GAS TAPPING MACHINES.

George Light, Dayton, O..... 416

STEAM BLOWER FOR BURNING BREEZE.

H. E. Parson, Brooklyn, N. Y..... 429

GAS COALS.

Penn Gas Coal Co., Phila., Pa..... 431
Perkins & Co., New York City..... 430
Despard Gas Coal Co., Baltimore, Md..... 431
Westmoreland Coal Co., Phila., Pa..... 431
Berwind-White Coal Mining Co., New York and Phila... 430

CANNEL COALS.

Perkins & Co., New York City..... 430

CONVEYORS.

The Link-Belt Machinery Co., Chicago, Ills..... 419

GAS ENRICHERS.

Standard Oil Co., New York City..... 431
The Sun Oil Co., Pittsburgh, Pa..... 431

COKE CRUSHER.

C. M. Keller, Columbus, Ind..... 431

GAS GAUGES.

The Bristol Co., Waterbury, Conn..... 421

GAS GOVERNORS.

Connelly Iron Sponge and Governor Co., New York City 429
Isbell-Porter Co., New York City..... 434
R. D. Wood & Co., Phila., Pa..... 434
Wm M. Crane Co., New York City..... 418

CEMENTS.

C. L. Gerould, Galesburg, Ills..... 428

RETORTS AND FIREBRICKS.

J. H. Gautier & Co., Jersey City, N. J..... 428
Adam Weber, New York City..... 428
Laclede Firebrick Mfg. Co., St. Louis, Mo..... 428
Cyrus Borgner, Phila., Pa..... 428
James Gardner, Jr., Pittsburgh, Pa..... 428
Henry Maurer & Son, New York City..... 428
Baltimore Retort and Firebrick Co., Baltimore, Md..... 428
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 428
Brooklyn Firebrick Works, Brooklyn, N. Y..... 428

REGENERATIVE FURNACES.

Bartlett, Hayward & Co., Baltimore, Md..... 433
Fred. Bredel, Milwaukee, Wis..... 432
J. H. Gautier & Co., Jersey City, N. J..... 428
Parker-Russell Mining and Mfg. Co., St. Louis, Mo..... 428
Adam Weber, New York City..... 428

SELF-SEALING MOUTHPIECE DOORS.

Isbell-Porter Co., New York City..... 434
Continental Iron Works, Brooklyn, N.Y..... 434
Logan Iron Works, Brooklyn, N. Y..... 436
. D. Wood & Co., Phila., Pa..... 434

INCANDESCENT GAS LAMPS.

Welsbach Commercial Co., Phila., Pa..... 426

BURNERS.

C. A. Gefrorer, Phila., Pa..... 434
Wm. M. Crane Co., New York City..... 419
D. M. Steward Mfg. Co., Chattanooga, Tenn..... 419

LAVA GAS TIPS.

D. M. Steward Mfg. Co., Chattanooga, Tenn..... 419

STREET LAMPS.

Welsbach Street Lighting Co., New York and Phila..... 424
Thos. T. W. Miner, New York City..... 417

PURIFIERS.

Stacey Mfg. Co., Cincinnati, O..... 430

PURIFYING MATERIALS.

Connelly Iron Sponge and Governor Co., New York City 429

VALVES.

Ludlow Valve Manufacturing Co., Troy, N. Y..... 421
Chapman Valve Manufacturing Co., Boston, Mass..... 421
R. D. Wood & Co., Phila., Pa..... 434
Continental Iron Works, Brooklyn, N. Y..... 434
The P. H. & F. M. Roots Co., Connersville, Ind..... 423
Isbell-Porter Co., New York City..... 434
The Western Gas Construction Co., Fort Wayne Ind.... 440

EXHAUSTERS.

The P. H. & F. M. Roots Co., Connersville, Ind..... 423
Isbell-Porter Company, New York City..... 434
Connelly Iron Sponge and Governor Co., New York City 429

ELECTRICAL APPARATUS.

Wm. Henry White, New York City..... 435

ENGINES AND BOILERS.

The Hazelton Boiler Company, New York City..... 417

PURIFIER SCREENS.

John Cabot, New York City..... 421

GAS STOVES.

American Meter Co., New York and Philadelphia..... 425
Maryland Meter and Manufacturing Co., Baltimore, Md. 438
Keystone Meter Co., Royersford, Pa..... 438
Wm. M. Crane Co., New York City..... 418
Nathaniel Tufts Meter Co., Boston Mass..... 438
National Stoves, Lorain, O..... 417
Abendroth Brothers, Port Chester, N. Y..... 417
Detroit Stove Works, Detroit, Mich..... 377

HOT WATER HEATERS.

Wm. M. Crane Co., New York City..... 418

GASHOLDER TANKS.

J P. Whittier, Brooklyn, N. Y..... 433

GASHOLDERS.

Bartlett, Hayward & Co., Baltimore, Md..... 433
Continental Iron Works, Brooklyn, N. Y..... 434
Delly & Fowler, Philadelphia, Pa..... 436
Davis & Farnum Mfg. Co., Waltham, Mass..... 432
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 432
Stacey Mfg. Co., Cincinnati, Ohio..... 435
R. D. Wood & Co., Philadelphia, Pa..... 434
Logan Iron Works, Brooklyn, N. Y..... 436
Riter-Conley Mfg. Co., Pittsburgh, Pa..... 435
Chris. Cunningham & Son, Brooklyn, N.Y..... 418

GAS SECURITIES.

Henry Marquand & Co., New York City..... 417

ADVERTISING.

J. Howland Harding, New York City..... 417

WANTED,

Position as Superintendent.

A hustler, with experience in selling gas stoves, understands the manufacture of coal and water gas, is assistant to Superintendent of Works, with an output of three hundred million per annum.

1292-1 Address "S. U. C.," care this Journal.

POSITION WANTED

As Superintendent of Plant,

Or on construction of gas works. Satisfaction guaranteed and references exchanged, by young married man.

1289-4 Address "H. E. L.," care this Journal.

Position Wanted

As Manager or Engineer of a Gas Company.

Thoroughly Competent Gas Manager of many years' experience in the manufacturing and the executive ends of a Gas Company desires a position as Manager or Engineer of a Gas Company selling not less than 50,000,000 cubic feet per annum. Highest references given. Address "T.,"

1267-tf Care this Journal.

WANTED.

Operator for Improved Lowe Water Gas Apparatus.

A good, reliable man, perfectly sober, as operrtor for Improved Lowe Water Gas Apparatus of 300,000 cubic feet capacity. Send application to

SUPERINTENDENT FORT WAYNE GAS CO.,

1292-3 Fort Wayne, Ind.

WANTED,

PURIFIERS.

Two second-hand purifiers in good condition, not less than 8 x 10 or larger than 12 x 14 feet, and not less than 3 feet deep. Address "KNOX,"

1292-4 Care this Journal.

WANTED,

CANVASSER FOR GAS STOVES,

Western town. Apply, stating wages required on a six months' contract.

1252-tf Address "G.," care this Journal.

Gas Meters for Sale.

We have for sale good second-hand gas meters, 3 lights, $2.50; 5 lights, $3; larger sizes in proportion.

THE COLUMBUS GAS COMPANY,

1291 tf Columbus, O.

Backus Gas Heaters at ¼ Cost Price!

We have for sale, at one-fourth cost price, a lot of Backus Gas Heaters. Most of them have never been used. Write for list and particulars.

THE COLUMBUS GAS COMPANY,

1288-tf COLUMBUS, O.

MRS. ALICE CARY WATERMAN,

Demonstration Lectures

In the Delightful Art of Cookery. For Gas Companies a Specialty. Chicago Address,

1292-2 1913 DEMING PLACE.

CORNELL & UNDERHILL,

Wrought & Cast Iron Pipe,

MALLEABLE AND CAST IRON FITTINGS,

Brass and Iron Cocks and Gate Valves,

13 GOLD STREET, NEW YORK.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

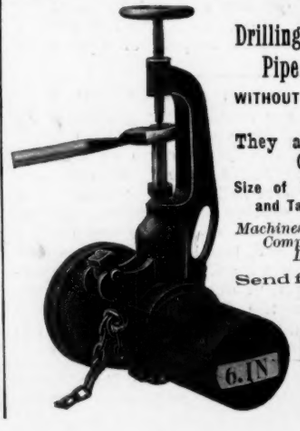
WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.



Geo. Light,
DAYTON, O.

For Sale.

A Small Gas and Electric Light Plant,

in a Southern city of 3,800 inhabitants.

Address FORT WAYNE ELECTRIC CORPORATION,

1097-tf Fort Wayne, Ind.

PLANS ADVICE WRITING ILLUSTRATING

J. HOWLAND HARDING, ADVERTISING, 1545 BROADWAY LONG ACRE SQUARE NEW YORK

HENRY MARQUAND & CO.,

BANKERS AND BROKERS.

160 Broadway, New York City.

Utilize Your Gas Liquor.

NO EXTRA LABOR OR OPERATING EXPENSES.

Ammonia Concentrator,

Not Expensive. Write to

STROH & OSIUS, Pat'ees, or Mich. Ammonia Works, Detroit, Mich.

REMOVAL NOTICE.

The Hazelton Boiler Company

have removed to their NEW WORKS at Rutherford, New Jersey.

Please address all communications to the Company at their New Office, **120 Liberty Street, N. Y. City.**

"THE MINER"

Globe Street and Boulevard Lamps.

Cheapest and Best.

THOUSANDS IN USE WITH INCANDESCENT BURNERS.

Send for Catalogues.

THOMAS T. W. MINER,

821-823 Eagle Av., N.Y.

For Cutting Cast, Wrought Iron, Gas & Water Pipes.

THE ANDERSON PIPE CUTTER COMPANY, Manufacturers, 163 Liverpool st., E. Boston, Mass

N. Y. Office, 135 Greenwich St. C. H. TUCKER, Jr., Manager.

WALDO BROS., 102 Milk Street, Boston, Mass.

DIRECT ACTION GAS RANGE

Is the Most Economical Gas Consumer on the Market.

We can and will prove this to you if you desire. SEVEN FEET OF GAS will turn out a baking of biscuits well done. Write us, we can save you some trouble.

"NATIONAL STOVES,"

LORAIN, OHIO.

YORK GAS RANGE,

Possessing Features Found in No Other.

HIGH IN EFFICIENCY, HANDSOME IN DESIGN.

The construction of our oven for 1900 is entirely new, BEING QUICK and ECONOMICAL.

Our New Catalogue is now ready, if you have not received a copy, send us your name and address and we will be pleased to send you copy.

ABENDROTH BROS.,

109-111 Beekman St., New York City. Port Chester, N. Y.

WE GIVE THE BEST.

OUR NEW CATALOGUE, No. 17, IS OUT.

Send for a Copy!

Shows large line of new goods.

"VULCAN" HIGH SHELF.

"VULCAN" ELEVATED WARMING CLOSET.

NEW "VULCAN" WATER HEATER.

"VULCAN" PERPENDICULAR BROILER.

"VULCAN" INSTANTANEOUS WATER HEATER, ETC., ETC., ETC.

Complete line of Gas Appliances for Heating, Cooking and Manufacturing Purposes.

SOLE AGENTS FOR BRAY BURNERS,

William M. Crane Company,

1131-1133 BROADWAY, NEW YORK.

Factory: Peekskill, N. Y.

CHRIS. CUNNINGHAM & SON,

PROPRIETORS,

THE NOVELTY STEAM BOILER WORKS,

BROOKLYN, N. Y.

STORAGE TANKS FOR GAS WORKS,

To Retain Fluid Material of Any Sort.

PIPING IN AND AROUND GAS WORKS.

Work Done for Several of the Largest Gas Companies in America Stands as Reference.

W. H. PEARSON, Prest. W. H. PEARSON, Jr., Vice-President. J. T. WESTCOTT, M.E., Manager. L. L. MERRIFIELD, M.Inst.M.E., Chief Engineer.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION CO., LD.

American Offices: 269 FRONT STREET, EAST, TORONTO, ONT.
London Offices: 19 ABINGDON STREET, WESTMINSTER, S.W.

Telegraphic Address: "CARBURETED LONDON AND TORONTO."

The above Company have erected since 1893, or are now erecting, their universal type of Carbureted Water Gas Plants at the following Gas Works:

	Cubic Feet Daily.
Blackburn, Eng.	1,250,000
Windsor Street Works, Birmingham, Eng.	2,000,000
Saltley Works, Birmingham, Eng.	2,000,000
Colchester, Eng.	300,000
Birkenhead, Eng.	2,250,000
Swindon (New Swindon Gas Co.), Eng.	120,000
Saltley Works, Birmingham, Eng. (2d Contract)	2,000,000
Windsor St. W'ks, Birming'm, Eng. (2d Contract)	2,000,000
Halifax, Eng.	1,000,000
Toronto,	250,000
Ottawa,	250,000
Toronto (Second Contract, Remodeled),	2,000,000
Lindsay (Remodeled),	125,000
Belleville,	250,000
Ottawa (Second Contract),	250,000
Brantford (Remodeled)	200,000
St. Catherine's (Remodeled),	250,000
Kingston, Pa.	125,000
Montreal,	500,000
Peterborough, Ont.	250,000
Wilkesbarre, Pa.	750,000
St. Catherine's (Second Contract),	250,000
Buffalo, N. Y.	2,000,000
Winnipeg, Man.	500,000
Colchester, Eng. (Second Contract),	300,000
York, Eng.	750,000
Rochester, Eng.	500,000
Kingston, Ont.	300,000
Crystal Palace District, Eng.	2,000,000
Duluth, Minn.	300,000
Caterham, Eng.	150,000
Enschede, Holland,	150,000
Leicester, Eng.	2,000,000
Buenos Ayres (River Platte Co.),	700,000
Burnley, Eng.	1 500,000

LET US GIVE YOU A

STEWARD'S BURNERS

GIVE YOU

Best Results.

The D. M. Steward Mfg. Co.,

New York Office, 107 CHAMBERS ST.

CHATTANOOGA, Tenn.

BRAY BURNERS STAND FOR EFFICIENCY, DURABILITY.

Not only in America but throughout the World. Thousands of Gas Companies, appreciating the commercial advantage of using the BEST KNOWN and HIGHEST STANDARD Burners, are using the BRAY BURNERS almost exclusively. IT PAYS TO BUY THE BEST. Send for our Blue Book.

W. M. CRANE COMPANY,

THE THOMAS DAY COMPANY, Distributing Agents for the Pacific Coast, SAN FRANCISCO, CAL.

Sole Agents for the United States, 1131 & 1133 Broadway, New York.

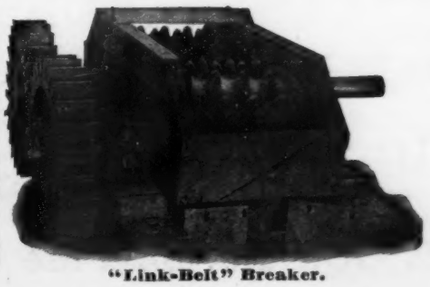
SAFETY GAS MAIN STOPPER Co.

211-E. 116 TH ST. N.Y.

FOR SHUTTING OFF GAS IN MAINS TEMPORARILY DURING ALTERATIONS AND REPAIRS

THE LINK-BELT MACHINERY CO.,

ENGINEERS, FOUNDERS, MACHINISTS, Chicago, U. S. A.



"Link-Belt" Breaker.

LINK-BELT ELEVATING & CONVEYING MACHINERY for HANDLING COAL, COKE, OXIDE, ETC

Tilting Coal and Coke Cars, Breaker Rolls, Shaking Screens, Power Transmitting Machinery

Machinery designed and erected to suit existing conditions and available space.

CATALOGUE UPON APPLICATION.

Sutherland Construction & Improvement Co.

Offices: 15 WALL ST., NEW YORK, and OSHKOSH, WISCONSIN.

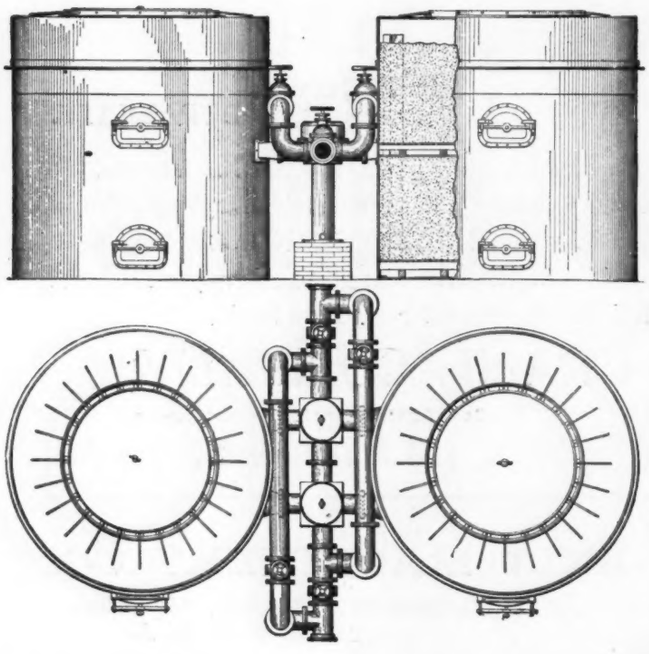
Owners of the "SUTHERLAND" Patents for Water Gas Apparatus.

Gas, Electric Light, Water Works, and Electric Street Railways Built, Remodeled, Operated, Bought and Sold.

A few of the places where the SUTHERLAND Apparatus is in successful operation:

Ilion, N. Y.
Herkimer, N. Y., 2 orders.
Little Falls, N. Y.
Fishkill-on-Hudson, 2 orders.
Clifton Springs, N.Y., 2 orders.
Green Bay, Wis.
Stevens Point, Wis.
Tarrytown, N.Y., 3 orders.
Ft. Henry, N. Y.
Gainsville, Fla.
Hollidaysburg, Pa.
Waterville, N. Y.
Huntington, L. I.
Lexington, Mo.
Mendota, Ill.
Circleville, O.
Joplin, Mo.
Ashville, N. C.
Youngstown, O.
Kingston & Rondout, N. Y.

CORRESPONDENCE SOLICITED.



CHOLLAR'S SYSTEM OF GAS PURIFICATION.

Covered by Five U.S. Patents.

In operation, revivification of the oxide is effected by repeated reversals of the direction of the flow of the gas through the beds (in the two boxes used under this system there are eight different routes for the gas to take) whereby the purified gas is made to revive the oxide in parts of the apparatus while the foul gas is fouling it in others.

The boxes are charged or discharged from the sides as well as the top.

There are no Hydraulic Cups or heavy covers.

Either end of the apparatus is inlet or outlet at pleasure.

The capacity is increased five-fold or more over ordinary methods without addition to building.

The apparatus costs less than for any other system.

For Estimates Write **The Stacey Mfg. Co.,**
SOLE MANUFACTURERS,
FOR FURTHER INFORMATION WRITE CINCINNATI, OHIO.
B. E. CHOLLAR, 411 N. 11th St., St. Louis, Mo.

Coal Tar Genealogical Tree.

Mr. T. Viner Clarke, of London, Eng., having compiled a novel Chart or Map illustrating the various CHEMICAL PRODUCTS DERIVED FROM COAL AND COAL TAR, in the form of a Genealogical Tree, including all the products discovered (the total number amounting to near 700), offers for sale a limited number of copies in Colors, mounted on Linen, with Rollers. Price, $3.50. Orders may be sent to

A. M. CALLENDER & CO., No. 32 Pine Street, New York

NOTICE.

We have in our yard, at East Berlin, Conn., a very large stock of beams, channels, angles, plates and other structural material of high quality. We are able to furnish from this stock any ordinary bridge, building, roof or other structural work promptly and with no delay. We invite correspondence.

THE BERLIN IRON BRIDGE CO.,

BOSTON OFFICE:
Room 200,
Equitable Building.

NEW YORK OFFICE!
Room 718 Bennett Building,
Cor. Fulton and Nassau Sts.

MAIN OFFICE AND WORKS:
EAST BERLIN, CONN.

PURIFIER and SCRUBBER

TRAYS

OF ALL KINDS.

Send for Circulars.

John Cabot,

553-557 West Thirty-third Street, New York.

CHAPMAN VALVE MANUFACTURING CO.

MANUFACTURERS OF

Valves and Gates for Gas, Ammonia, Water, Etc.

Also, Gate Fire Hydrants with and without Independent Nozzle Valve. All Work Guaranteed.

Works & Gen'l Office, Indian Orchard, Mass. Treasurer's Office, 72 Kilby & 112 Milk Sts., Boston, Mass.
Chicago Office, 24 West Lake St. New York Office, 28 Platt St.
St. Louis Office, L. M. Rumsey Mfg. Co., 810 North Second St.

Bristol's Recording

PRESSURE GAUGE.

For continuous records of

Street Gas Pressure.

Simple in construction, accurate in operation, and low in price.

Fully Guaranteed. Send for Circulars.

THE BRISTOL CO.,

Waterbury, Conn.

THE

Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

Double and Single Gate Valves, ¼" to 72",

—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

AMERICAN GAS COMPANY

Constructors of Coal Gas Apparatus.

BREDEL'S SYSTEM Recuperative Furnaces, Washers, Condensers, Purifiers and Purifying Machines, Ammonia Plant, Coke Conveyers, Charging and Discharging Machines, Etc.

Complete Works Erected with Guaranteed Results.

EASTERN AGENTS FOR

BREDEL'S SYSTEM
COAL GAS PLANTS AND GAS APPARATUS.

P. H. & F. M. ROOTS CO.'S
Exhausters, Governors, etc.

GENERAL AGENTS FOR

BRONDER'S CHARGING AND DISCHARGING MACHINES.

AMERICAN GAS COMPANY,

222 South Third Street, Philadelphia, Pa.

FRED. BREDEL, C.E.

Coal and Water Gas Plants.

OWN SYSTEM.

RECUPERATIVE FURNACES, WASHERS, CONDENSERS, PURIFIERS, PURIFYING MACHINES, COKE CONVEYERS, ETC

SOLE UNITED STATES AGENT FOR
ARROL-FOULIS MECHANICAL CHARGING AND DRAWING MACHINES.

Gas Enriching Plants to Enrich Coal Gas up to 24 Candle Power, and Making a White, Bright, Non-smoking Gas

GAS RETORTS AND SPECIAL BLOCKS AND FIREBRICK MANUFACTURED UNDER THE SUPERINTENDENCE OF MY OWN CHEMIST.

COMPLETE GAS WORKS

No. 118 Farwell Avenue, · Milwaukee, Wis

Eastern Agents: AMERICAN GAS CO., Construction Department, 222 So. 3d St., Phila., Pa

ROOTS'

LATEST IMPROVED GAS EXHAUSTER

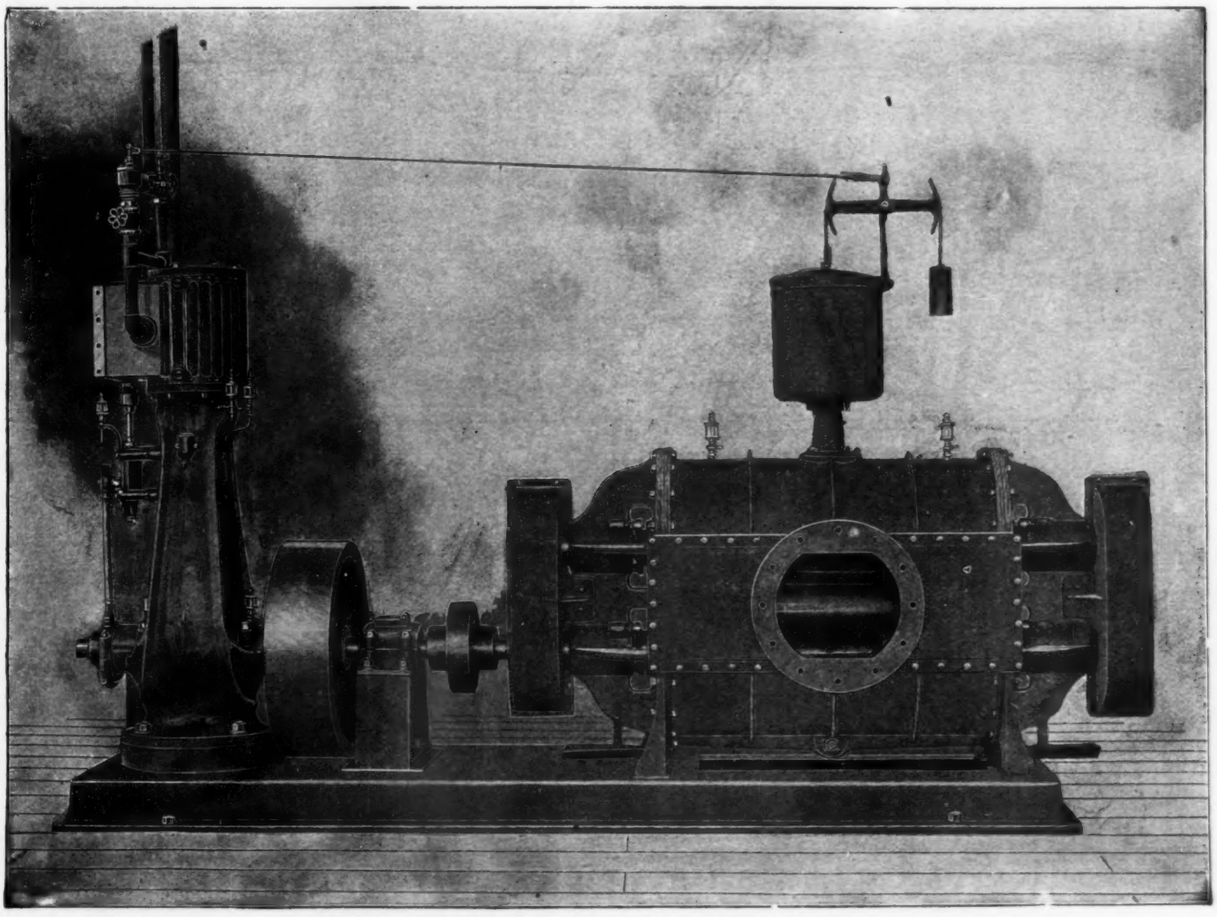
—AND—

NEW GAS GOVERNOR AND STEAM VALVE.

GUARANTEED TO REGULATE WITHIN ONE-TENTH OF AN INCH, WATER PRESSURE.

The Most Perfect Gas Governor on the Market.

MORE DIRECT IN ACTION. FEWER PARTS.
EASIER TO ADJUST THAN ANY OTHER GOVERNOR.



INQUIRIES CHEERFULLY ANSWERED. WRITE FOR CATALOGUE.

P. H. & F. M. ROOTS CO.,

Connersville, Ind. **109 Liberty St., New York.**

Eastern Office:

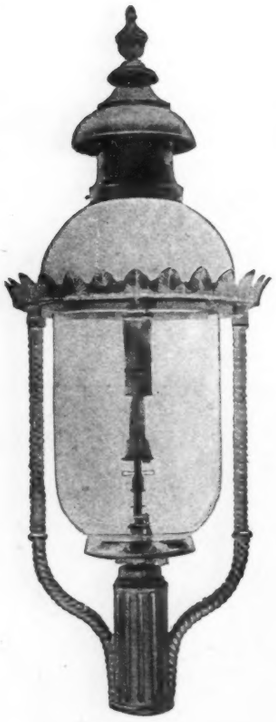
American Gas Company,

222 South Third Street, Philadelphia, Pa.

NEW YORK, 33 Nassau St. PHILADELPHIA, Broad and Arch Sts. CHICAGO, 54 Lake St.

Welsbach Street Lighting Company

.... OF AMERICA ....



No. 36.

Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in seventy-five Cities and Towns.

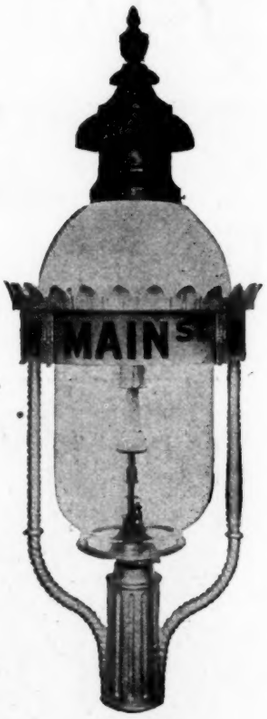
By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.



No. 38.

Correspondence solicited from Gas Companies and others interested in Municipal and outside lighting.

NOW READY.

THE SIXTH (AND CENTENARY) EDITION

— OF THE —

Handbook for Gas Engineers and Managers.

By THOMAS NEWBIGGING, M. Inst. C.E.

This Edition of the "Handbook for Gas Engineers and Managers" is a great improvement on all previous editions Much of the text has been re-written, in order to keep the work abreast of the constant advances that are being made in the Gas Industry.

PRICE, - - $6.00.

A. M. CALLENDER & CO., - - No. 32 Pine Street, N. Y. City.

PRACTICAL HANDBOOK ON

GAS ENGINES

With Instructions for Care and Working of the Same.

By G. LIECKFELD, C.E.

Translated with Permission of the author by GEO. M. RICHMOND, M.E

Price, $1.00.

A. M. CALLENDER & CO., 32 Pine Street, New York.

(Copyrighted, 1894, by the AMERICAN METER CO.

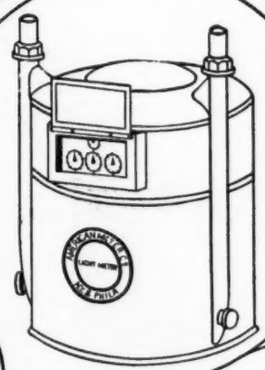
AMERICAN METER CO.

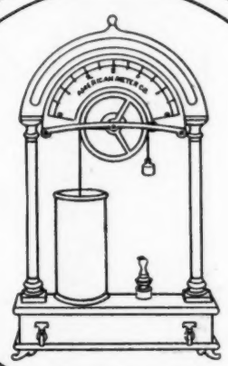
ESTABLISHED 1834. INCORPORATED 1863.

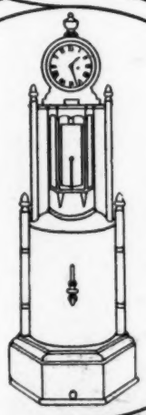
NEW YORK AND PHILADELPHIA,

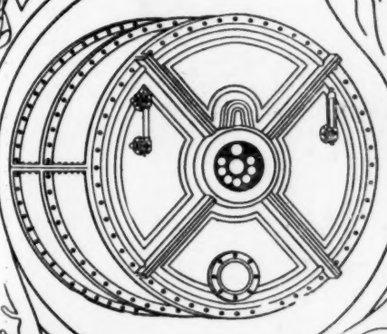
CHICAGO, ST. LOUIS,

SAN FRANCISCO.









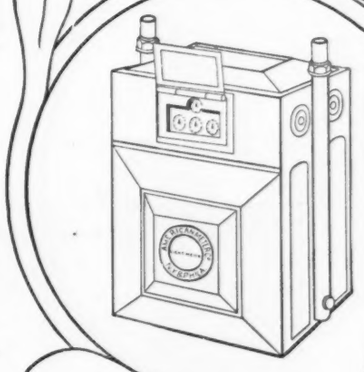
PUBLIC LIGHTING TABLE.

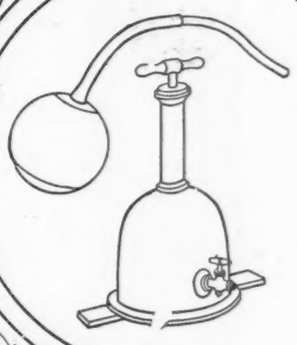
MARCH, 1900.

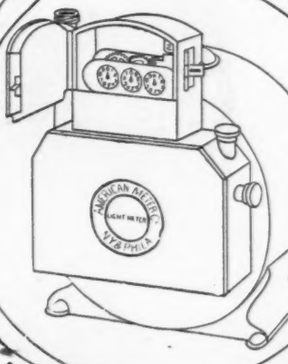
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Thu.	1	6.20 PM	5.30 AM	5.30	5.45
Fri.	2	6.20	5.30	5.30	5.45
Sat.	3	6.20	5.30	5.30	5.45
Sun.	4	6.20	5.20	5.30	5.45
Mon.	5	10.20	5.20	5.40	5.35
Tue.	6	11.30	5.20	5.40	5.35
Wed.	7	12.30 AM 2d	5.20	5.40	5.35
Thu.	8	1.20	5.20	5.40	5.35
Fri.	9	2.00	5.20	5.40	5.35
Sat.	10	2.40	5.20	5.40	5.35
Sun.	11	3.10	5.10	5.40	5.35
Mon.	12	3.40	5.10	5.50	5.20
Tue.	13	4.00	5.10	5.50	5.20
Wed.	14	No L.	No L.	5.50	5.20
Thu.	15	No L. FM	No L.	5.50	5.20
Fri.	16	No L.	No L.	5.50	5.20
Sat.	17	6.40 PM	8.40 PM	5.50	5.20
Sun.	18	6.40	9.40	5.50	5.20
Mon.	19	6.40	10.40	6.00	5.10
Tue.	20	6.40	11.40	6 00	5.10
Wed.	21	6.40	12.40 AM	6.00	5.10
Thu.	22	6.40	1.40	6.00	5.10
Fri.	23	6.40 LQ	2.30	6.00	5.10
Sat.	24	6.40	3.10	6.00	5.10
Sun.	25	6.50	4.00	6.00	5.10
Mon.	26	6.50	4.30	6.10	4.55
Tue.	27	6.50	4.50	6.10	4.55
Wed.	28	6.50	4.50	6.10	4.55
Thu.	29	6.50	4.50	6.10	4.55
Fri.	30	6.50 NM	4.50	6.10	4.55
Sat.	31	6.50	4.50	6.10	4.55

TOTAL HOURS LIGHTING DURING 1900.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	230.50	January	423.20
February	175.40	February	355.25
March	189.00	March	355.35
April	160.30	April	298.50
May	150.40	May	264.50
June	137.00	June	234.25
July	152.00	July	243.45
August	171.50	August	280.25
September	187.20	September	321.15
October	213.10	October	374.30
November	221.50	November	401.40
December	231.50	December	433.45
Total, yr.	2221.40	Total, yr.	3987.45







"YUSEA"
A new standard of Strength and Light.

Yusea Welsbach Mantle Saves money.

Yusea Welsbach Mantle Saves Chimneys.

Yusea Welsbach Mantle It's faultless.

Yusea Welsbach Mantle It's Perfect.

Yusea Welsbach Mantle Fits all burners.

Yusea Welsbach Mantle Triple Strength

Yusea Welsbach Mantle A long life.

Yusea Welsbach Mantle Try it and see.

Yusea Welsbach Mantle New Standard

Yusea Welsbach Mantle A revelation.

50 per cent. more light than any other mantle, and three times the strength, insure

"A LONG LIFE AND A BRIGHT ONE."

Sold Everywhere. Price 50 Cents.

"YUSEA" Welsbach MANTLE

BEWARE OF COUNTERFEITS

See that mantle bears our trade mark, "Yusea Welsbach."

Always in box with perforated seal.

Do not accept mantle if seal is broken.

Welsbach Commercial Co.

PHILADELPHIA, Pa.

SALESROOMS

PHILADELPHIA, 1530 Chestnut St.
CHICAGO, 67 Washington St.
NEW YORK, 1133 Broadway.
PITTSBURG, 722 Penn Ave.
BUFFALO, 12 E. Eagle St.
DETROIT, 235 Griswold St.
CLEVELAND, 293 Erie St.
ROCHESTER, 28 N. Fitzhugh St.
ST. LOUIS, 1011 Olive St.
SAN FRANCISCO, 138 Ellis St.
DENVER, Toltec Building.
NEW ORLEANS, 213 Baronne St.
WASHINGTON, 439 Seventh St., N W.
BALTIMORE, 203 N. Liberty St.
BOSTON, 22 West St.
CINCINNATI, 415 Main St.

If your dealer cannot supply you, the "Y-use-a" mantle will be sent from any of the above salesrooms, charges prepaid, upon receipt of price.

Yusea Welsbach Mantle Price 50¢

"Y-USE-A"

Yusea Welsbach Mantle Price 50¢

THE UNITED GAS IMPROVEMENT COMPANY.

THE STANDARD JUNIOR,

THE STANDARD DOUBLE SUPERHEATER,

LOWE WATER GAS APPARATUS.

Total Sets Installed to January 1, 1900, - - - - - - - - 327

Total Daily Capacity - - - - - - - - - 207,425,000 Cu. Ft.

WATER GAS PLANT AS AUXILIARY TO COAL GAS WORKS.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY Prest. DAVID R. DALY V. Prest. & Treas.
H. D. ABERNETHY. Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES,
FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

E. D. WHITE, President. A. H. GUTKES, Vice-President. H. A. PERKINS, Secretary.

Brooklyn Fire Brick Works,

MANUFACTURERS OF

CLAY RETORTS, FIRE BRICK,
Gas House and other Tile.

Office, 88 Van Dyke St. Brooklyn, N. Y.

Established 1854. Incorporated 1869.

LACLEDE
Fire Brick Manufg. Co.,

Manufacturers of { GAS RETORTS . .
FIRE BRICK . . .
RETORT SETTINGS

Water Gas Cupola Linings, Fire Clay, Etc.

Exclusive Agents for

The Mitchell Half-Depth Regenerative Furnace.

This is the *original* coal-consuming Furnace for Retort Benches. Burns either Coal or Coke. Full and Half-Depth Regenerative Furnaces for Benches of 6's, 7's, 8's or 9's erected complete.

Proprietors of the Coze System of Inclined Retorts.

Office: 901 Pine St., **St. Louis, Mo.**

The Construction of Gas Works

PRACTICALLY DESCRIBED,

By WALTER RALPH HERRING.

Price $2. For Sale by

A. M. CALLENDER & CO.,

32 Pine Street, N. Y. City.

Adam Weber,

Proprietor,

Manhattan Fire Brick and Enameled Clay Retort Works.

Works, Weber, N. J.

Office, 633 East 15th St., New York.

Modern Recuperative Furnaces

And Standard Fire Brick and Gas Retorts

Works, LOCKPORT STATION, PA.

—ESTABLISHED 1864.—

JAMES GARDNER, JR.,

Hamilton Building, Fifth Avenue, PITTSBURGH, PA. P. O. Box 373.

Successor to WILLIAM GARDNER & SON

Fire Clay Goods for Gas Works.

SOLE REPRESENTATIVE OF THE McILHENNY REGENERATIVE BENCHES FOR THE U. S.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.

OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,

BENCH SETTINGS,

Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. Galesburg or Mount Vernon.

In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD, Galesburg, Ills.

Eastern Agent, PERRY BORDEN, 19 Prospect Ave., MOUNT VERNON, N. Y.

Parker-Russell Mining and Mfg. Co.,

CITY OFFICE,

417 Pine Street, St. Louis, Mo.

PROPRIETORS OF THE

OAKHILL GAS RETORT & FIRE BRICK W'KS

Our immense establishment is now employed almost entirely in the manufacture of

Materials for Gas Companies

We have studied and perfected three important points. Our retorts are made to stand changes of temperature, the strongest heats of the furnace, and the abrasion of feeding and emptying. We construct

Half and Full Depth Benches of Our Own Design,

Containing 6, 8 or 9 Retorts.

We have Greatly Improved our Recuperators. Coal or Coke can be used as Fuel in Furnaces.

THEO. J. SMITH, Prest. J. A. TAYLOR, Sec
A. LAMBLA, Vice-Prest. and Supt.

BALTIMORE
RETORT & FIRE BRICK CO.

MANUFACTORY AT

LOCUST POINT BALTIMORE MD.

Clay Retorts, Blocks & Tiles

FIRE BRICK, FIRE CLAY,
AND FIRE CEMENT.

Red and Buff Ornamental Tiles and Chimney Tops. Baker Oven Tiles 12x12x2 and 10x10x2.

WALDO BROS., 102 MILK ST., BOSTON, MASS.

Sole Agents for New England States.

PRACTICAL PHOTOMETRY.

A Guide to the Study of the Measurement of Light.

By WILLIAM JOSEPH DIBDIN.

With Numerous Illustrations Price, $3.00. A. M. CALLENDER & CO., 32 Pine Street, N. Y. City

National Gas and Water Company.

CONTRACTORS FOR
Gas Plant Machinery

SOFT COAL OR COKE
WATER GAS GENERATORS
A SPECIALTY.

218 LA SALLE ST.,
CHICAGO.

Gas Engineers
INSPECTION AND ADVICE.

PLANS AND ESTIMATES
FOR IMPROVEMENTS OR
REPAIRS.

CONNELLY IRON SPONGE AND GOVERNOR CO.

(Successors to CONNELLY & CO.)
MANUFACTURERS OF GAS WORKS SPECIALTIES.

"IRON SPONGE." Saves money, saves labor, and is the most efficient purifying material ever offered as a substitute for lime. We guarantee a large saving, both in cost of material and labor.

AUTOMATIC GOVERNOR. OVER FOUR HUNDRED NOW IN USE! NO WORKS COMPLETE WITHOUT IT! WILL PAY FOR ITSELF WITHIN A YEAR! ITS SERVICE SECURES PERFECT DISTRIBUTION! REDUCES LEAKAGE TO MINIMUM, and BENEFITS THE COMPANY and CONSUMER ALIKE! IT IS THE ONLY RECOGNIZED AUTOMATIC GOVERNOR IN THE WORLD!

STEAM JET EXHAUSTER. Designed particularly for small works. Combines Exhaust Tube, Steam Governor, Gas Compensator and Bye-Pass Valves in the most compact form possible. Occupies but little space; uses very little steam; saves formation of carbon in retorts; increases yield 10 to 15 per cent. No works too small to use them profitably.

Prices given on all our specialties, delivered at any point in the United States. Correspondence solicited.

CONNELLY IRON SPONGE AND GOVERNOR CO., No. 357 Canal St., New York.

Hughes' "Gas Works,"

Their Construction and Arrangement,

And the Manufacture and Distribution of Coal Gas.

Originally written by SAM'L HUGHES, C.E.

Rewritten and Much Enlarged by
WM. RICHARDS, C.E

Eighth Edition, Revised, with Notices of Recent Improvements.

Price, $1.65.

A. M. CALLENDER & CO.,
32 Pine St., N. Y. City.

Parson's Steam Blower,

FOR IMPROVING BAD DRAUGHT IN BOILERS, AND FOR BURNING BREEZE OR OTHER WASTE MATERIAL.

PARSON'S TAR BURNER,

FOR USING COAL TAR AS FUEL.

PARSON'S AIR JET TUBE CLEANER,

FOR CLEANING BOILER TUBES.

These devices are all first-class. They will be sent to any responsible party *for trial*. No sale unless satisfactory. Manufactured by the WATERTOWN STEAM BLOWER COMPANY.

H. E. PARSON, Supt., 457 Putnam Ave., Brooklyn, N. Y

The Chemistry of Illuminating Gas.

By NORTON H. HUMPH Price, $2.40.

A. M. CALLENDER & CO., 32 PINE ST., N. Y. CITY.

The Gas Engineer's Laboratory Handbook.

By JOHN HORNBY, F.I.C.

Price, $2.50.

A. M. CALLENDER & CO., 32 Pine Street, N. Y. City.

Practical Hints on the Construction and Working of Regenerator Furnaces,

By MAURICE GRAHAM, Assoc. M. Inst. C.E.

Price, $1.25. For Sale by

A. M. CALLENDER & CO., No. 32 Pine Street, New York City.

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

TIDEWATER SALES AGENTS FOR THE FOLLOWING:

Ocean Mine Youghiogheny Gas Coal,
Old Kentucky Shale and O. K. Boghead.

SHIPMENTS FROM NEW YORK, PHILADELPHIA, BALTIMORE AND NORFOLK.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:
Washington Building, New York.
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully prepared.
For Gas Making or
Heavy Steaming.

SCIENTIFIC BOOKS.

GAS MANUFACTURE, THE CHEMISTRY OF, by W. J. A. Butterfield. $3.50.
NEWBIGGING'S HANDBOOK. By Thos. Newbigging. 6th edition. $6.
COX'S GAS FLOW COMPUTER. $2.50.
FIELD'S ANALYSIS, 1898. $5.
HUGHES' GAS WORKS. $1.65.
POOLE ON FUELS. By Herman Poole. $3.
GAS ENGINEER'S POCKET-BOOK. By Henry O'Connor. $8.50.
TECHNICAL GAS ANALYSIS. $3.
GAS CONSUMER'S HANDYBOOK, by Wm. Richards. 20 cents.
CHEMISTRY OF ILLUMINATING GAS. By Norton H. Humphrys. $2.40.
PRACTICAL TREATISE ON HEAT By Thomas Box. 2d edition. $5.
PRACTICAL PHOTOMETRY: A Guide to the Study of the Measurement of Light. By W. J. Dibdin. $3.
CHEMICAL TECHNOLOGY: Vol. I., *Fuel and Its Applications*, $5. Vol. II., *Lighting*, $4.
IRONWORK: Practical Designing of Structural Ironwork. By H. Adams. $3.50.
HEMPEL'S GAS ANALYSIS, $2.
LIQUID FUEL FOR MECHANICAL AND INDUSTRIAL PURPOSES. By E. A. Brayley Hodgetts. $2.50.
COAL: Its History and Use. By Prof. Thorpe. $3.50.
PRACTICAL HANDBOOK ON GAS ENGINES, by G. Lieckfield. $1.
HEAT A MODE OF MOTION. By John Tyndall. $2.50.
THEORY OF HEAT. By J. Clerk-Maxwell. $1.50.
MANUAL FOR GAS ENGINEERING STUDENTS. By D. Lee. 40 cents.
GASFITTER'S GUIDE, by John Eldridge 40 cents.
AMMONIA AND AMMONIUM COMPOUNDS. By Dr. R. Arnold. $2
CONSTRUCTION OF GAS WORKS, by Walter Ralph Herring. $2.
DIGEST OF GAS CASES. $5.
PRACTICAL HINTS ON REGENERATOR FURNACES By M. Graham. $1.25.
A TREATISE ON THE COMPARATIVE COMMERCIAL VALUES OF GAS COALS AND CANNELS. By D. A. Graham. $3.
A TEXT BOOK OF INORGANIC CHEMISTRY. By Prof. Victor Von Richter. $2.
ILLUMINATING AND HEATING GAS. By W. Burns. $1.50
HANDBOOK FOR MECHANICAL ENGINEERS. By H. Adams. $2.50.
TREATISE ON MASONRY CONSTRUCTION. Baker. $5
GAS ENGINEER'S LABORATORY HANDBOOK. By Jno. Hornby. $2.50.
GAS LIGHTING AND GAS FITTING. By W. P. Gerhard. 50 cents.
PRACTICAL PLUMBING. By P. J. Davies. $3.
AMERICAN PLUMBING. By Alfred Revill. $2.
CEMENT; A Manual of Lime and Cement, their Treatment and Use in Construction. By A. H. Heath. $2.50.
A COMPARISON BETWEEN THE ENGLISH AND FRENCH METHODS OF ASCERTAINING THE ILLUMINATING POWER OF COAL GAS. $1.60.

ELECTRICITY.

INDUSTRIAL PHOTOMETRY, with Special Application to Electric Lighting. By A. Palaz, Sc.D. $4.
ELEMENTS OF ELECTRIC LIGHTING, Including Electric Generation, Measurement, Storage and Distribution. By Philip Atkinson. $1.50.
ELECTRIC TRANSMISSION OF ENERGY. By G. Kapp. $3.50.
ELECTRICIAN'S POCKETBOOK. By Monroe and Jamieson. $2.50.
MAGNETISM AND ELECTRICITY. By J. Overend. 40 cts
DYNAMO BUILDING. By F. W. Walker. 50 cents.
DOMESTIC ELECTRICITY FOR AMATEURS. By E. Hospitalier. $2.50.
PRACTICAL MANAGEMENT OF DYNAMOS AND MOTORS. $1.
PRACTICAL GUIDE TO THE TESTING OF INSULATED WIRES AND CABLES. $1.
ELECTRIC LIGHTING, by Francis B. Crocker. $3.
ELECTRIC LIGHT FITTING. $2.
PRACTICAL ELECTRICITY. $2.50.
ELECTRICITY FOR ENGINEERS. $2.50.
ELECTRICITY, Its Theory, Sources and Applications. By John T. Sprague. $6.

The above will be forwarded upon receipt of price. If sent by mail or express, postage or express charge must be added to above prices. We take especial pains in securing and forwarding any other Works that may be desired, upon receipt of order. All remittances should be made by check, draft, or post office money order. No books sent C.O.D.

A. M. CALLENDER & CO., 32 Pine Street, New York.

The Despard Gas Coal Co.,

MINERS AND SHIPPERS OF

DESPARD GAS COAL,

AND MANUFACTURERS OF

COKE.

MINES, - - Clarksburgh, Harrison Co., West Va.
WHARVES, - - - Locust Point Baltimore, Md.
OFFICE, - 640 Equitable Building Baltimore, Md.

ROUSSEL & HICKS, 71 Broadway, N. Y. } AGENTS, { BANGS & HORTON, 60 Congress St., Boston.

KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,
Sec. & Supt. Gas Lt. & Coke Co.,
Columbus, Ind.
Correspondence Solicited.

Do You Wish to Know

what size of pipe to use to convey any quantity of gas, any distance, with any loss of pressure and any initial or final pressure? Then use

Cox's Gas Flow Computer,

as it gives this information accurately at sight, without mental effort. No calculations needed. Saves time, money and mistakes.

Price, 6.5 x 8 inches, in cloth case, $2.50. For sale by

A. M. Callender & Co., 32 Pine St., N. Y.

GREENOUGH'S "DIGEST OF GAS CASES."

Price, $5.00.

This is a valuable and important work, a copy of which should be in the possession of every gas company in the country, whether large or small. As a book of reference it will be found invaluable. It is the only work of the kind which has ever been published in this country, and is most complete. Handsomely bound. Orders may be sent to

A. M. CALLENDER & CO., 32 Pine St., N. Y.

— THE —

PENN GAS COAL CO.

OFFER THEIR

Coal, Carefully Screened and Prepared for Gas Purposes.

Their property is located in the Youghiogheny Coal Basin, near Irwin and Penn Stations on the Pennsylvania Railroad, and on the Youghiogheny River.

Principal Office:

Room 720, Reading Terminal Building, Phila., Pa.

Points of Shipment:

Pennsylvania Railroad Piers; Greenwich Wharves, Delaware River: Pier No. 1 (Lower Side), South Amboy, N. J.

EDMUND H. McCULLOUGH, Prest. CHAS. F. GODSHALL, Treas. H. C. ADAMS, Sec.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J.,
WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

Principal Office, 224 South 3d St., Phila., Pa.

THE SUN OIL CO.

Crude Oil, Gas Naphtha,
Refined Petroleum, Gas Oil.

Toledo, O., and Pittsburgh, Pa.

Standard Oil Company,

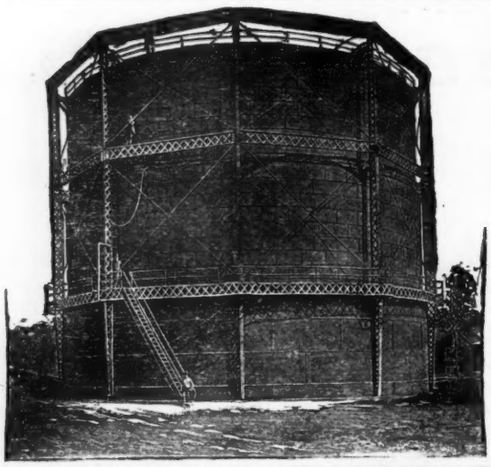
GAS NAPTHA DEPARTMENT.

GAS NAPTHA.

GAS OIL.

Correspondence Solicited.

26 Broadway, New York City.



DAVIS & FARNUM MFG. CO.,
WALTHAM, MASS.

Principal Office & Works, Waltham, Mass. Boston Office, R'm 18, Vulcan Bldg., 8 Oliver St.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Borrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

BAXTER & YOUNG,
CONTRACTING AND CONSULTING GAS ENGINEERS.

Examination and Values Ascertained of Artificial and Natural Gas Properties.

COMPLETE GAS WORKS ERECTED.

Artificial and Natural Gas Mains Furnished and Laid.

CORRESPONDENCE SOLICITED.

OFFICE : WAYNE COUNTY BANK BUILDING,
Rooms 201 & 202. DETROIT, MICH.

A. E. BOARDMAN, C. E.,
Consulting and Contracting Engineer.

Particular attention given to Gas, Water and Electric Plants. Long and successful experience with the problem and practice of

Filtration for Public Water Supply.

BREVARD, N. C.

Geo. Shepard Page's Sons.
GAS MACHINERY.

Correspondence Solicited.

180 Fulton Street, New York City.

JAMES T. LYNN,
GAS ENGINEER
AND
CONTRACTOR,

Wayne Bank Building, - DETROIT

GAS PROPERTIES PURCHASED.

DAVID LEAVITT HOUGH,
Consulting Engineer
AND
CONTRACTOR,
374 FIFTH AVE., N. Y

Kerr Murray Manufacturing Company,

Steel Gasholder Tanks,

SINGLE, DOUBLE AND TRIPLE-LIFT GASHOLDERS,

HORIZONTAL AND VERTICAL STORAGE OIL TANKS

Iron Work for Coal Gas Benches, Self-Sealing Mouthpieces, Exhausters, Condensers, Scrubbers, Purifiers, Wooden Trays, Floor Carriages, Center Seal and Valve System Connections, Cast and Wrought Iron Fittings, and Connections 3 to 36 Inches Diameter.

VALVES, Double Gate, Hub and Flange, Outside Screw and Quick Opening, 3 to 36 In. Diam.

COAL AND COKE WAGONS, RETORT HOUSE TOOLS, STREET MAIN SPECIALS AND DRIPS.

Address,

KERR MURRAY MANUFACTURING CO.
Fort Wayne, Indiana.

BARTLETT, HAYWARD & CO.

BALTIMORE, MD.

Triple, Double and Single-Lift Gasholders.

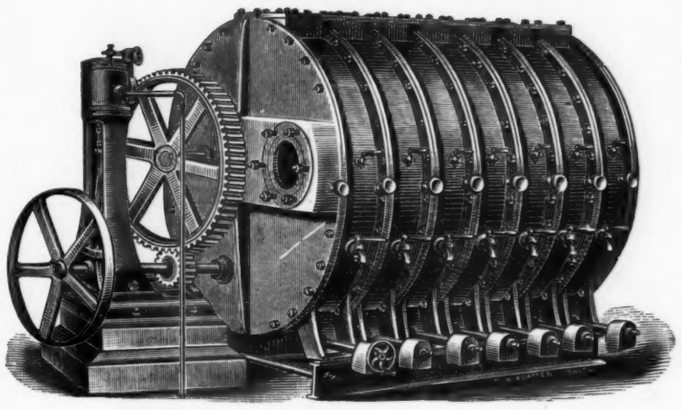
Iron Holder Tanks.

ROOF FRAMES.

Girders.

BEAMS

PURIFIERS.



CONDENSERS.

Scrubbers.

Bench Castings.

OIL STORAGE TANKS

Boilers.

PATENT STANDARD WASHER-SCRUBBER.

The best apparatus for the extraction of all Ammonia and a large proportion of Carbonic Acid and Sulphureted Hydrogen. The Scrubber has been materially improved and is provided with patented Wooden Segmental Grids, instead of Metallic Discs, thus reducing the weight on shaft and power for operating same

The Wilkinson Water Gas Process.

THIRTY-CANDLE, NON-CONDENSIBLE, FIXED GAS. THE MOST SUCCESSFUL GAS PROCESS IN OPERATION.

MILL'S REVERSIBLE LIME TRAYS.

Gas Works Designed and Constructed.

ALEX. C. HUMPHREYS, M. E., M. Inst. C. E. ARTHUR G. GLASGOW, M. E., M. Inst. C. E.

HUMPHREYS & GLASGOW,

BANK OF COMMERCE BLDG.,
31 Nassau Street,
New York.

9 VICTORIA STREET
London S. W.,
Eng and.

CONSULTING GAS ENGINEERS
AND MANAGERS.
GAS PROPERTIES PURCHASED.

GASHOLDER TANKS AND
GAS WORKS MASONRY COMPLETE

Plans prepared and Estimates furnished at short notice.

J. P. WHITTIER,
238 Java Street, Brooklyn, N. Y.

GEORGE R. ROWLAND.

Formerly with the Continental Iron Works.

Draughtsman and Constructing Engineer.

Drawings, Specifications and Estimates furnished for the construction of new works or alteration of old works. Special attention given to Patent Office drawings.

Office, No. 245 Broadway, N. Y. City.

R. D. WOOD & CO.,

ENGINEERS, IRON FOUNDERS, MACHINISTS.

400 Chestnut Street, Philadelphia, Pa.,

MANUFACTURERS OF

CAST IRON PIPE.

BUILDERS OF

Gas Holders,

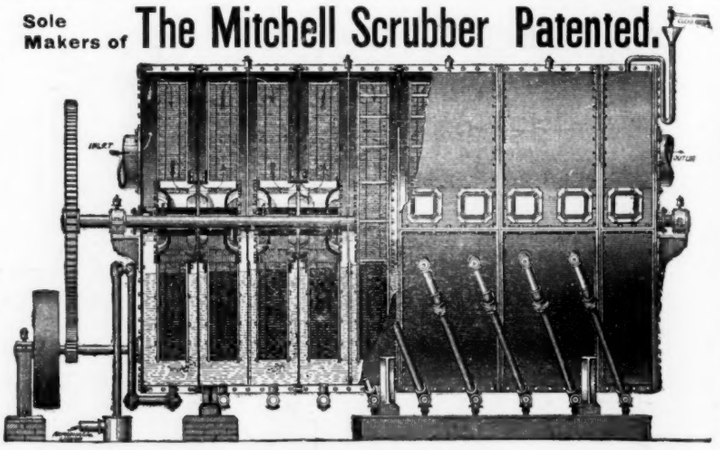
Single, Double and Triple Lifts, with or without Wrought Iron or Steel Tanks,

PURIFIERS, CONDENSERS, SCRUBBERS.

Send for Pamphlet.

Dunham Patent Specials.

Sole Makers of **The Mitchell Scrubber Patented.**



ISBELL-PORTER CO.,

ENGINEERS AND CONTRACTORS FOR THE

Construction and Extension of Gas Works.

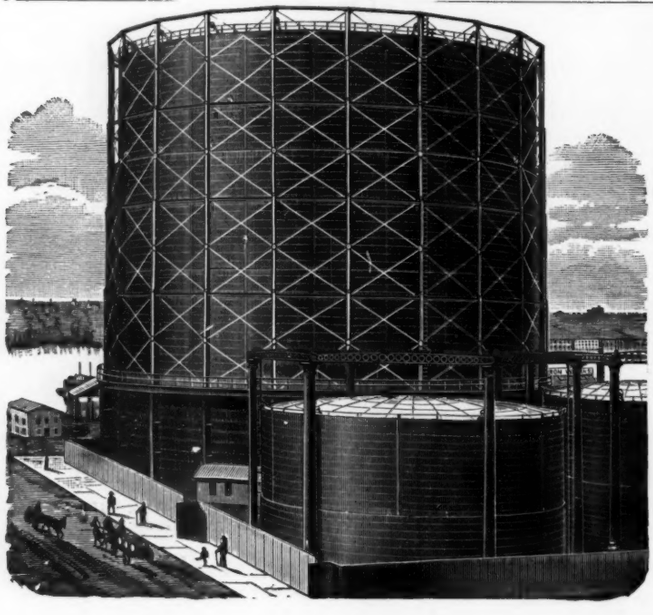
FOUNDERS AND MACHINISTS.

MANUFACTURERS OF

All Ironwork and Machinery Required in a Gas Plant.

Estimates, Drawings and Specifications furnished for the Alteration, Improvement, or Extension of Existing Works or the Construction of New Works.

245 Broadway, New York City. OFFICES **Bridge & Ogden Sts., Newark, N. J.**



The Continental Iron Works,

THOMAS F. ROWLAND, President.
WARREN E. HILL and CHAS. H. CORBETT, Vice-Presidents.
THOMAS F. ROWLAND, Jr., Secretary & Treasurer.

West and Calyer Sts. (Near 10th & 23d St. Ferries)
NEW YORK, Borough of Brooklyn.

BUILDERS OF

Gas Holders.

Single and Multiple Section Gas Holders a Specialty.

STEEL GAS HOLDER TANKS.

BENCH CASTINGS, RETORT LIDS.

Hydraulic Mains, Condensers, Scrubbers, Purifiers, Valves, Etc.

Self-Sealing Retort Mouthpieces & Lids

For Round, Oval, or "D" Retorts.

ILLUMINATING GAS! FUEL GAS!

THE LOOMIS PROCESS.

Now in successful operation at Works of John Russell Cuttlery Co., Turner's Falls, Mass., and Henry Disston's Son's Saw Works, Tacony, Pa.

The Cheapest Gas Generating System in the World.

Plans and Estimates Furnished.

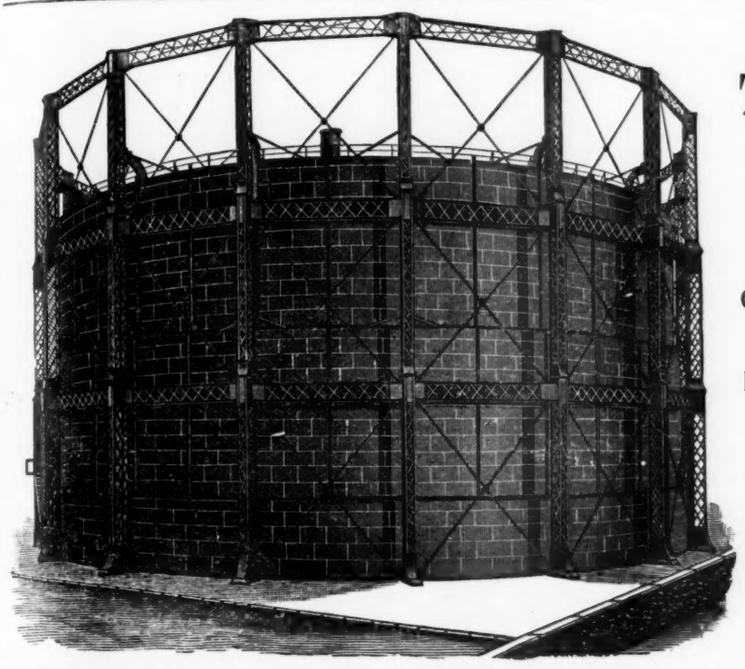
BURDETT LOOMIS, - - Hartford, Conn.

To Gas Companies.

We make to order **CAP BURNERS** to burn any amount under a stated pressure. Send for samples.

Also SERVICE CLEANERS, DRIP PUMPS, and STREET MAIN PROVING APPARATUS.

C. A. GEFRORER,
248 N. 8th St., Phila., Pa.



H. RANSHAW, Prest. & Mangr. T. H. BIRCH, Asst. Mangr.
WILLIAM STACEY, Vice-Prest. R. J. TARVIN, Sec. & Treas.

THE STACEY MANUFACTURING CO.
Established 1851.

Single, Double and Triple-Lift

GASHOLDERS,

Of any Capacity, with or without Wrought Iron or Steel Tanks.

Hydraulic Mains, Condensers, Scrubbers, Purifiers, Valves, etc.

Coal Gas Benches, Roof Frames,

OIL STORAGE TANKS.

Pressed Steel Mouthpiece Lids, Self-Sealing Mouthpiece Lids.

Cincinnati, Ohio.

RITER-CONLEY MFG. CO.,

GASHOLDERS, with or without Steel Tanks.

Purifiers, Condensers, Scrubbers, Oil Tanks, Smoke Stacks.

STEEL ROOFS and BUILDINGS.

PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

GENERAL OFFICE: Pittsburg, Pa. EASTERN OFFICE: 39-41 Cortlandt St., New York City.

WM. HENRY WHITE,

No. 32 Pine Street, - - - New York City.

ENGINEER AND CONTRACTOR FOR THE

ERECTION AND EXTENSION OF

GAS, WATER, AND ELECTRIC LIGHT WORKS.

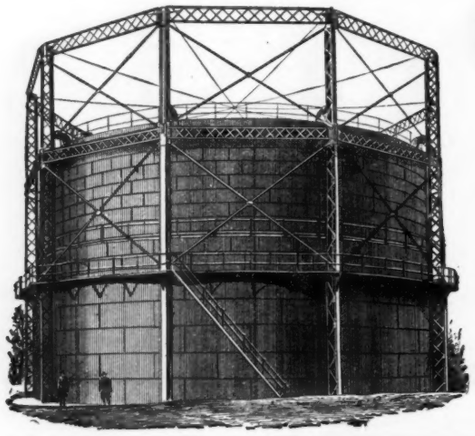
Correspondence with Gas Companies contemplating extending or improving their Plants respectfully invited.
Plans and Estimates Furnished.

1899 DIRECTORY 1899

OF AMERICAN GAS COMPANIES

Price - - - - - - - - $5.00.

A. M. CALLENDER & CO., - - No. 32 Pine Street, New York.



1842 ✻ Deily & Fowler, ✻ 1900

LAUREL IRON WORKS.

Office, No. 39 Laurel Street, Philadelphia, Pa.

BUILDERS OF

Gasholders

Single or Telescopic. With or Without Iron or Steel Tanks.

OIL TANKS, WATER TANKS, AND GENERAL WROUGHT IRON WORK.

James R. Floyd's Sons,

FREDERICK W. FLOYD, President.
HENRY E. FLOYD, Vice-President.
JAMES R. FLOYD, Jr., Sec'y & Treas.

531 to 543 West 20th Street and 530 to 540 West 21st Street, N. Y.

Engineers and Contractors for the Construction of Gas Works.

MANUFACTURERS OF

All Kinds of Castings and Iron Work for Gas Apparatus.

ESTABLISHED 1856.
INCORPORATED 1899.

Write for Estimates to
539, West 20th St., New York City.

LOGAN IRON WORKS,

Brooklyn, N. Y.

BUILDERS OF

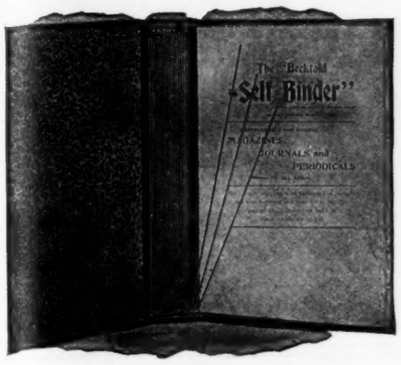
GASHOLDERS

Oil Tanks, Water Tanks, and General Wrought Iron Work.

1899 brought to us the Largest Number of Gasholder Contracts of any year in our history. Work was erected abroad as well as in many States of the Union, covering points separated by thousands of miles.

PLANS AND SPECIFICATIONS FURNISHED AND CORRESPONDENCE SOLICITED.

BINDER for the JOURNAL.



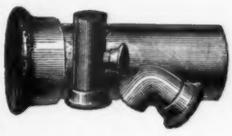
Price $1.00.

A. M. CALLENDER & CO., 32 Pine Street, N.Y.

WARREN FOUNDRY AND MACHINE CO.,

Established 1856. Works at Phillipsburgh, N. J.

New York Office, 160 Broadway.



CAST IRON WATER AND GAS PIPE,

FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc.

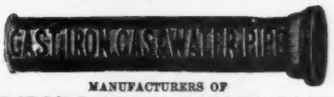
GENERAL SALES OFFICE, 192 BROADWAY, NEW YORK.

Western Office: Monadnock Block, Chicago, Ills.

GEORGE ORMROD, Mangr. & Treas., Emaus, Pa.
JOHN DONALDSON, Prest., Betz Bldg., Phila., P.

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.



MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

—THE—

Valuation of Gas, Electricity and Water Works

FOR ASSESSMENT PURPOSES.

SECOND EDITION.

By THOS. NEWBIGGING, M.Inst.C.E., and WM. NEWBIGGING, Assoc.M.Inst.C.E.

With an Appendix of Decided Cases.

Price $2. For Sale by

A. M. CALLENDER & CO., 32 Pine Street, N. Y. City.

POOLE ON FUELS.

THE CALORIFIC POWER OF FUELS.

By HERMAN POOLE, F.C.S.

Price, $3. For Sale by

A. M. CALLENDER & CO., 32 PINE ST., N.Y. CITY.

The Gas Engineer's Laboratory Handbook.

By JOHN HORNBY, F.I.C. Price, $2.50.

A. M. CALLENDER & CO., 32 PINE ST., N. Y. CITY.

Established 1854.

D. McDONALD & CO.,

MANUFACTURERS OF

WET AND DRY METERS, STATION METERS AND METER PROVERS.

ALSO MAKERS OF

THE GLOVER PREPAYMENT METER.

The amount of gas delivered for the coin can be instantly and positively changed without removing the meter or replacing any parts.

The gas registered agrees absolutely with the amount purchased by the coin.

WE HAVE MADE AND SOLD IN THE UNITED STATES

OVER 50,000 OF THESE METERS,

ALL OF WHICH ARE GIVING PERFECT SATISFACTION.

Correspondence Solicited.

511 West Twenty-first Street, NEW YORK. | 51, 53 & 55 Lancaster Street, ALBANY, N. Y. | 34 & 36 West Monroe Street, CHICAGO.

NATHANIEL TUFTS METER CO.,

8 Medford Street, Boston, Mass.

MANUFACTURERS OF

DRY GAS METERS.

Station Meters of any Capacity.

Test and Experimental Meters, Pressure Registers, Pressure Gauges.

METER PROVERS, PHOTOMETERS, STREET LANTERNS, ETC., ETC.

Prepayment Gas Meters.

Established 1849. With the best facilities for manufacturing, is enabled to furnish reliable work and answer orders promptly.

CHARLES E. DICKEY. JAMES B. SMALLWOOD. CHARLES H. DICKEY.

THE MARYLAND METER AND MANUFACTURING CO.

Established 1866.

BALTIMORE, North & Saratoga Sts. **CHICAGO, 107 West Monroe St.**

SAN FRANCISCO, 221 Front St.

CONSUMERS' & STATION METERS, PRESSURE GAUGES, Etc., Etc.

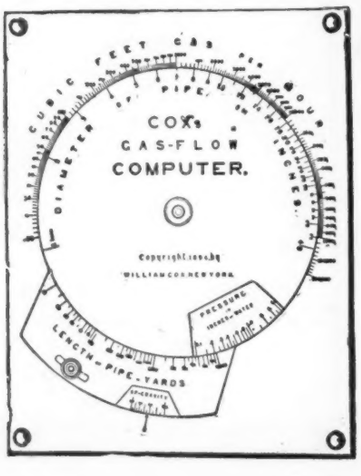
"Perfect" Gas Stoves

A PERFECTLY ACCURATE METER
AN ALWAYS-TO-BE-DEPENDED-ON METER
A BEST-MADE METER
A SURE-TO-PLEASE METER

THE KEYSTONE METER

Made at ROYERSFORD, PA.

Pacific Coast Supplied by WIESTER & CO., 17 & 19 New Montgomery St., San Francisco, Cal.



Do you wish to Know

what size of Pipe to use to convey any quantity of Gas, any distance, with any loss of pressure, and any initial or final pressure? Then use

COX'S GAS FLOW COMPUTER,

as it gives this information accurately at sight, without mental effort. No calculations needed. Saves time, money and mistakes.

Price, 6.5 x 8 inches, in cloth case, $2.50.

For sale by

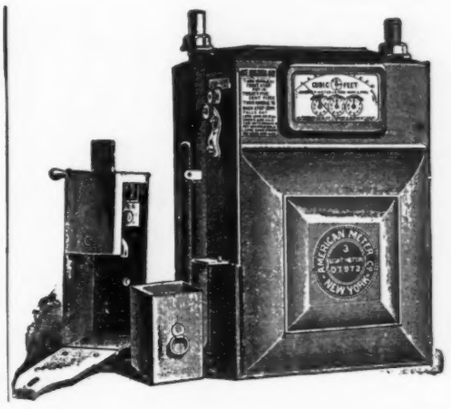
A. M. CALLENDER & CO., 32 Pine St., N. Y. City.

American Meter Co.

NEW YORK, PHILADELPHIA,
SAN FRANCISCO.

Prepayment Meters.

Their construction is such that they may be readily readjusted when the scale of gas rates is changed.



HELME & McILHENNY,

Established 1848. **1339 to 1349 Cherry Street, Philadelphia, Pa.**

MANUFACTURERS OF

Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

PREPAYMENT GAS METERS.

Our Own Patents. Strong. Simple. PROMPT ATTENTION. CORRESPONDENCE SOLICITED.

METRIC METAL COMPANY,

MAKERS OF

GAS METERS for NATURAL and ARTIFICIAL GAS.

Special Attention given to Repairing METERS of all Makes.

FACTORY AT ERIE, PA.

This is the best time to look after your repairing.

Seventy per cent. of old meters run slow. You are losing money on them. Let us put them in shape for you, a few at a time, until your entire meter equipment is made as good as new. It is better to attend to this matter now, before the Gas Stove season is at its height. Probably we can do such work in our factory better and cheaper than you can do it at home, and just now we can do it promptly.

The BUHL METERS are as good Meters as you can get.

DETROIT METER COMPANY, - - Detroit, Mich.

The Advertisement of

JOHN J. GRIFFIN & CO., Mfrs. of Gas Meters, etc.,

Nos. 1513, 1515, 1517, 1519 & 1521 Race Street, Philadelphia,

52 Dey Street, New York, 75 N. Clinton Street, Chicago,

Occupies this space every alternate week.

THE WESTERN GAS CONSTRUCTION CO., FORT WAYNE, IND.

IMPROVED

COAL GAS APPARATUS,

COMPLETE SYSTEM OF

Exhausters, Condensers, Tar Extractors, Washers, Scrubbers, Tar Separators and Ammonia System,

For the Complete Progressive Treatment of the Gas from the Retort Outlet to the Purifiers.

PURIFICATION.

Ordinary Purifiers and 4-way or Valve Systems. IMPROVED DUPLEX and TWIN PURIFIERS with DUPLEX VALVE for obtaining the maximum efficiency of apparatus and economy in handling materials on minimum capital expenditure.

Coal Gas Bench Castings.

Steel Hydraulic Mains, Self-Sealing and Common Mouthpieces, Steel Tanks, Riveted Steel Pipe, Steel Roofs and Buildings, Street Main Specials, Ammonia Apparatus, Tar Distilling Plants, Rotary Washers, Street Main Governors.

VALVES.

Our PATENTED DESIGN, especially suitable for FOUL MAINS, for Street Mains and Works use. Can be opened, inspected, cleaned and repaired while in place.

Improved Lowe Water Gas Apparatus.

Original Installations and Auxiliary Plants and Designs for Special Situations. All capacities. Over 70 plants installed and in successful operation.

WILLIAM HENRY WHITE,
EASTERN ENGINEER,
32 Pine St., New York.

The Western Gas Construction Co.,
FORT WAYNE, INDIANA.